CHAPTER 11

MATERIEL SYSTEM RESEARCH, DEVELOPMENT, AND ACQUISITION MANAGEMENT

"Modernizing the U.S. Army is more than just enhancing and developing new weapons platforms. It is the examination of the future of warfare and new operations concepts made possible by advanced technology. We are focusing on the soldier as both a subsystem of our aircraft and ground vehicles, and as a system himself. We have empowered our Army acquisition professionals to continuously find smarter ways to doing business, and we are seeing good results."

Paul J. Hoeper
Assistant Secretary of the Army
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INTRODUCTION

In 1986, the Goldwater-Nichols Department of Defense Reorganization Act and National Security Decision Directive (NSDD) 219 directed changes to the defense acquisition system. In particular, NSDD 219 directed the Services to:

- appoint full-time Service Acquisition Executives (SAEs) to administer acquisition programs,
- appoint Program Executive Officers (PEOs) for a defined number of programs,
- direct that Program Managers (PMs) report on program matters directly to a PEO (or the SAE), and
- establish no more than one level of program supervision between a PM and the SAE, and not more than two levels between the PM and Defense Acquisition Executive (DAE).

In effect, NSDD 219 created a programmatic decision chain analogous to that found in the corporate business community. The Defense Acquisition Executive and, in the case of the Army, the AAE, are the Defense Department's counterparts to the corporate Chief Executive Officer (CEO) and Group Vice Presidents in industry.

The Defense Acquisition Workforce Improvement Act (DAWIA), Title 10, USC was enacted to improve the overall effectiveness and professionalism of military and civilian personnel who work in acquisition--which is *"the planning, design, development, testing, contracting, production, introduction, acquisition logistics support, and disposal of systems, equipment, facilities, supplies, or services that are intended for use in, or support of military*

missions" as defined in *DODD 5000.52*. The major aspects of DAWIA include:

- recognizing acquisition as a professional career field;
- establishing an Acquisition Corps within each of the services;
- establishing an acquisition career management structure within DOD;
- identifying career paths in acquisition for civilians and military personnel;
- establishing programs to assist acquisition personnel in their professional development;
- improving the education, training, and experience levels of acquisition professionals;
- establishing policy to provide for the selection of the best qualified individual for a position; and
- establishing policy for effective management of the acquisition workforce.

This chapter describes the Department of Defense (DOD) and U.S. Army Management System used for the Research, Development, and Acquisition (RDA) of materiel systems, both major and nonmajor. As a result of the Federal Acquisition Streamlining Act (FASTA) of 1994 and the DOD Process Action Team (PAT) efforts to re-engineer the acquisition oversight and review process, the current materiel systems acquisition structure within DOD and the Army is in a state of change. Major system acquisition policy changes resulting from these activities are currently being integrated into the DOD and Army materiel acquisition systems. That system can be viewed simply as a combination of structure, process, and culture.

Structure is the sum of the guidance provided by law, policy, regulation or objective, and the organization provided to accomplish the RDA function. Process is the interaction of the structure in producing the output. Culture is the cumulative sum of past practices and their impact on interpretation of guidance and attitude toward institutional changes to the system.

For the Army, the focus of materiel acquisition management output is producing military units that are adequately trained, equipped, and maintained to execute national military strategy (NMS) effectively. The focus of the RDA management system is the development and acquisition of systems that are affordable and support the enforcement of our NMS. The RDA management system is a fully coordinated effort concerned with the total fielding of a system consisting of hardware, software, logistic support, manuals, organizations, doctrine, facilities, personnel, training, and spares. Figure 11-1 shows the elements of Systems Acquisition Management.

The RDA system manages a significant portion of the Army's annual budget (FY99: 13.9%). To facilitate an understanding of the process, this chapter will begin by highlighting some of the critical aspects of structure.

DOD ORGANIZATION AND MANAGEMENT

DOD Policy.

The basic policy is to ensure that acquisition of defense systems is conducted efficiently and effectively in order to achieve operational objectives of the U.S. Armed Forces in their support of national policies and objectives within the guidelines of the *Office of Management and Budget (OMB) Circular A-109*: *Major System Acquisitions. DOD Directive 5000.1: Defense Acquisition,* 15

Systems Acquisition Management Individual Elements

System	Acquisition	Management
• Hardware	• Determine Need	• Plan
• Software	• Design	• Organize
• Logistic Support	• Develop	• Staff
• Manuals	• Test	• Control
• Organizations	• Produce	• Lead
• Doctrine	• Field	
• Facilities	• Support	
• Personnel	• Improve	
• Training	• Replace	
• Spares	• Dispose	

Figure 11-1

March 1996 and *DOD Regulation 5000.2R: Mandatory Procedures for Major Defense Acquisition Programs (MDAPs) and Major Automated Information System (MAIS) Acquisition Programs*, change 3, 23 March 1998, are the documents that provide the DOD guidance for system acquisition policy and procedure. These documents establish an integrated management framework for a single, standardized DOD-wide acquisition system that applies to all programs including highly sensitive, classified programs. Within the DOD system there are four acquisition program-size categories with decision authority placed at the lowest practical level. The system is characterized by four phases and four milestones (discussed later in the chapter) which track a DOD program's progress throughout its development and program life. "Tailoring" is encouraged in each phase of the process to reflect specific program needs. In accordance with *DODD 5000.1* "One size does not fit all."

The essential features of the DOD materiel acquisition system are:

- a clear acquisition strategy (AS),
- a thorough program plan,
- risk management techniques, and
- systematic program tracking against the plan.

NOTE: An acquisition program is defined as a directed, funded effort designed to provide a new, improved or continuing weapon system or automated information system (AIS) capability in response to a validated operational need. Acquisition programs are divided into different categories, which are established to facilitate decentralized decision-making, and execution and compliance with statutory requirements. Acquisition phases provide a logical means of progressively translating broadly stated mission needs into well-defined system-specific requirements and ultimately into operationally effective, suitable, and

survivable systems. All the tasks and activities needed to bring the program to the next milestone occur during acquisition phases. A milestone (MS) is the major decision point that initiates the next phase of an acquisition program. MDAP milestones may include, for example, the decisions to begin engineering and manufacturing development, or to begin either low-rate initial or full-rate production.

DOD Acquisition Management.

The Under Secretary of Defense for Acquisition and Technology (USD[A&T]) is the senior procurement executive and the principal staff assistant and adviser to the Secretary of Defense (SECDEF) and takes precedence in DOD for all matters relating to the materiel acquisition system: research and development, production, logistics; command, control, and communications, and intelligence activities related to acquisition; military construction; and procurement.

The USD(A&T) serves as the Defense Acquisition Executive (DAE) with responsibility for supervising the performance of the entire DOD acquisition system in accordance with the laws, Congressional guidance and direction, and *OMB Circular No. A-109*. The DAE establishes policy for all elements of DOD for acquisition. The basic policies of the DAE are established and implemented by *DODD 5000.1* and *DOD Regulation 5000.2R.* The DAE also serves as the chairman of the Defense Acquisition Board (DAB), assisted by three Overarching Integrated Product Teams (OIPTs) that relate to the acquisition process. As DAB chairman, the DAE recommends to the SECDEF acquisition resource matters and other acquisition management matters required to implement acquisition milestone decisions. A clear distinction exists between responsibility for weapon systems acquisition and budgetary authority. While the DAE, as DAB Chairman, makes recommendations on whether to proceed with plans to acquire major materiel systems, the Defense Resources Board (DRB), chaired by the Deputy Secretary of Defense (DEPSECDEF), makes budgetary recommendations on the same programs. Acquisition programs must operate within the parameters established by the DRB and the SECDEF through the Planning, Programming, and Budgeting (PPBS) process.

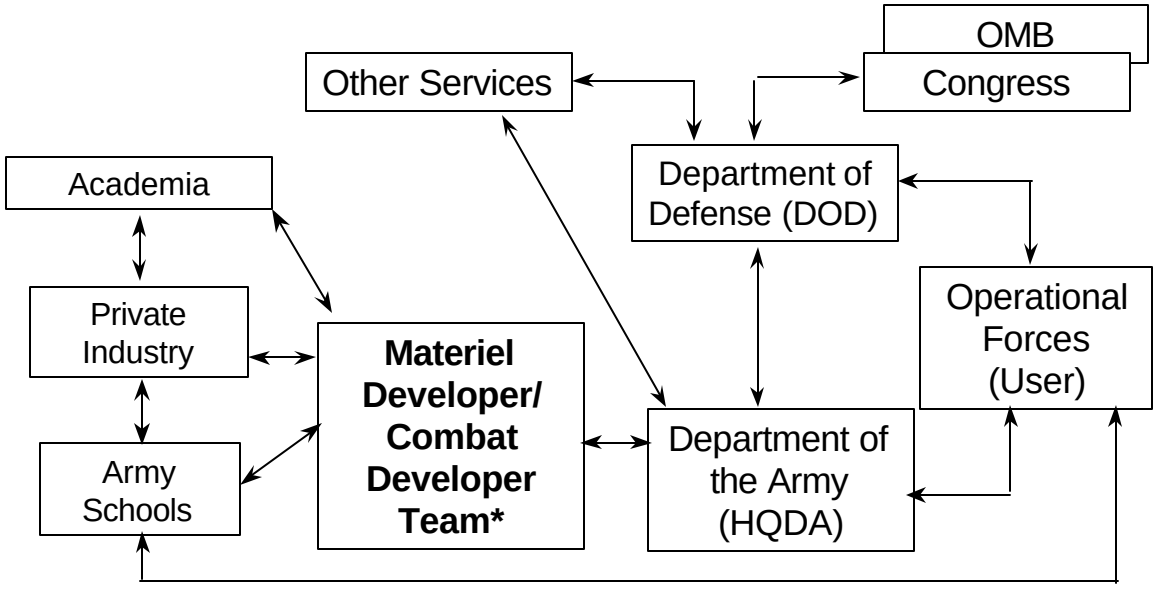
Organizational Linkage.

The managerial process of transforming a materiel requirement into a fielded and supported system consisting of hardware, software, and personnel is conducted by various organizational structures in DOD and the Services responsible for RDA. Figure 11-2 shows the primary elements involved for the Army, including the linkage between the defense community, industry, and academia. The arrows in the figure depict the flow of business in the process of this transformation.

DOD Science and Technology.

Since World War II, owning the technology advantage has been a cornerstone of our NMS. Technologies like radar, jet engines, nuclear weapons, night vision, global positioning, smart weapons, and stealth have changed warfare dramatically. Maintaining this technological edge has become even more important as U.S. force size decreases and high technology weapons become readily available on the world market. In this new environment, it is imperative that U.S. forces possess technological superiority to ensure success and minimize casualties across the

Organizational Linkage for Army Materiel Acquisition



* Materiel Developer includes Program Executive Officers (PEOs); Program, Project, Product Managers (PMs); and the U.S. Army Materiel Command (AMC). The Army's primary Combat Developer is U.S. Army Training and Doctrine Command (TRADOC). TRADOC Battle Labs, Integrated Concept Teams (ICTs), and Integrated Product Teams (IPTs) support the MATDEV/CBTDEV Team.

Figure 11-2

broad spectrum of engagements. The technological advantage enjoyed by the United States in Operation Desert Storm in 1991, and still enjoyed today, is the legacy of decades of wise investments in science and technology (S&T). Similarly, our warfighting capabilities 10 to 15 years from now will be substantially determined by today's investment in S&T.

Defense Science and Technology Strategy. The *Defense S&T Strategy* is supported by the *Basic Research Plan (BRP), Joint Warfighting S&T Plan (JWSTP), Defense Technology Area Plan (DTAP),* and *Defense Technology Objectives (DTO).* It provides DOD's S&T vision, strategy, plan, and a statement of objectives for the planners, programmers, and performers. Revised annually, these documents and the supporting individual S&T master plans of the Services and defense agencies guide the annual preparation of the DOD S&T budget and Program Objective Memoranda (POMs).

Basic Research Plan (BRP) presents the DOD objectives and investment strategy for DOD-sponsored Basic Research (6.1) performed by universities, industry, and Service laboratories. In addition to presenting the planned investment in 12 broad research areas, this year's plan highlights six strategic research objectives (SROs) holding great promise for enabling breakthrough technologies for 21st century military capabilities.

Joint Warfighting S&T Plan (JWSTP) objective is to ensure that the S&T program supports priority future joint warfighting capabilities. The *JWSTP* looks horizontally across the Services and agencies and together with the *DTAP* ensures that the near-, mid-, and far-term needs of the joint warfighter are properly balanced and supported in the S&T planning, programming, budgeting, and assessment activities of DOD. The *JWSTP* is focused around 10 Joint Warfighting

Capability Objectives (JWCOs). These objectives support the Joint Requirements Oversight Council (JROC), Joint Warfighting Capabilities Assessment (JWCA) process, and the four leveraged concepts emphasized in the Joint Vision 2010: dominant maneuver, precision engagement, full-dimension protection, and focused logistics. The *JWSTP* is issued annually as defense guidance. Advanced concepts and technologies identified as enhancing high priority joint warfighting capabilities, along with prerequisite research, receive funding priority in the President's Budget and accompanying Future Years Defense Plan (FYDP).

DOD Technology Area Plan (DTAP) presents the DOD objectives and the Applied Research (6.2) and Advanced Technology Development (6.3) investment strategy for 10 technology areas critical to DOD acquisition. It takes a horizontal perspective across Service and Agency efforts, thereby charting the total DOD-wide investment for each technology area. The *DTAP* documents the focus, content, and principal objectives of the overall DOD science and technology efforts. The 1999 *DTAP*, includes an assessment of the potential technology capabilities of other countries vis-a-vis the United States.

Defense Technology Objectives (DTOs). The focus of the S&T investment is enhanced and guided through DTOs. Each DTO identifies a specific technology advancement that will be developed or demonstrated, the anticipated date of technology availability, and the specific benefits resulting from the technology advance. These benefits not only include increased military operational capabilities but also address other important areas, including affordability and dual-use applications that have received special emphasis in the *Defense Science and Technology Strategy*. Each of the 350 DTOs identifies funding required to achieve the new capability. Two-thirds of the DTOs are identified and described in the *DTAP*, which cites the anticipated return on the S&T investment through 10 broad technology areas. The remaining DTOs support the 10 JWCOs of the *JWSTP*. *JWSTP* DTOs are limited to Advanced Technology Demonstrations (ATD) and Advanced Concept Technology Demonstrations (ACTD) discussed later in this chapter.

Defense Advanced Research Projects Agency (DARPA). DARPA is a unique management tool of the SECDEF. It consists of a mix of military and civilian scientists and engineers, and has a broad charter to conduct advanced research which fills R&D gaps between Service lines of responsibility or handles high priority problems that cross Service lines. DARPA is charged with the maintenance of leadership in forefront areas of technology so DOD can be aware as soon as possible of developments of potential military significance. DARPA's purpose is to review ongoing research and development, determine whether or not the concept is feasible, determine its usefulness, and transfer it to the appropriate Service. DARPA does not have its own in-house research facilities and relies on the Services and other Government agencies for technical and administrative support. Once a decision to support a research proposal is made, responsibility for contracting is generally assigned to one of the Services.

Defense Acquisition University (DAU).

The Defense Acquisition University is a consortium structure of existing DOD institutions that include the Defense Systems Management College. Its operation and structure is designed to be similar to a state university with many campuses each specializing in certain acquisition disciplines.

DAWIA required the formation of the DAU with operation commencing in 1992. Also, the law required the establishment of a senior course for personnel serving in critical acquisition positions (CAPs) that is equivalent to existing senior professional military education programs. The USD(A&T) has oversight authority for the acquisition curriculum of the course, located at the Industrial College of the Armed Forces (ICAF) of the National Defense University.

Defense Systems Management College (DSMC).

The Defense Systems Management College (DSMC) is the USD(A&T)'s institution for ensuring the up-to-date training of military and civilian professionals in the management of materiel acquisition programs in DOD. One such course is the Advanced Program Management Course (APMC), a required 14-week course for individuals seeking Level III certification in the Program Management Acquisition Career Field (ACF).

The Defense Systems Management College, founded 1971, is a joint military professional institution operating under the direction of the Policy Guidance Council, chaired by the USD(A&T), to support acquisition management as described in *DOD Directive 5000.1*, and to assist in fulfilling education and training requirements set out in appropriate DOD directives and public laws. The mission of the Defense Systems Management College is to:

- conduct advanced courses of study in defense acquisition management as the primary function of the College;
- conduct research and special studies in defense acquisition management;
- assemble and disseminate information concerning new policies, methods, and practices in defense acquisition management; and
- provide oversight for the education and training program for the acquisition work force.

ARMY ORGANIZATION AND MANAGEMENT

Army's RDA Goals.

The Secretary of the Army (SA) is responsible for functions necessary for the research, development, logistical support and maintenance, preparedness, operation, and effectiveness of the Army. Also required is supervision of all matters relating to Army procurement. The SA executes his acquisition management responsibilities through the Army Acquisition Executive (AAE).

Special emphasis is placed on medium and long-range materiel planning, product modification, and life extension programs. Major state-of-the-art advancements are sought only in carefully selected areas. Stability of materiel acquisition programs is a matter of utmost interest, especially after the system passes the Engineering and Manufacturing Development (EMD) milestone decision. Reliability, availability, and maintainability (RAM) goals; manpower and personnel integration (MANPRINT); integrated logistics support (ILS); survivability; effectiveness;

safety; and product quality are incorporated into system performance objectives. Contractual incentives for the improvement of RAM and ILS are encouraged.

Army Acquisition Executive (AAE).

The Assistant Secretary of the Army (Acquisition, Logistics, and Technology) (ASA [ALT]) is the AAE. The AAE is designated by the SA as the Component Acquisition Executive (CAE) and the Senior Procurement Executive within DA. He is the principal DA-staff official for the execution of the AAE responsibilities. When serving as the AAE, the ASA (ALT) is assisted by a Military Deputy (MILDEP) and the Director of Information Systems for Command, Control, Communications, and Computers (DISC4).

NOTE: On 16 February 1999, the SA transferred the logistics missions and functions from ASA (IL&E) to ASA (RDA) and renamed the two organizations. ASA (RDA) was renamed ASA (Acquisition, Logistics, and Technology) and ASA (IL&E) was renamed ASA (Installations and Environment).

The MILDEP is assigned to the Office of the ASA (ALT) and provides staff support to the AAE in managing the research development, developmental test, and the acquisition of materiel for all Army major weapon and support systems. The MILDEP, delegated down from the AAE, is the Army's Director, Acquisition Career Management (DACM). The DACM is responsible for directing the Army Acquisition Corps (AAC) as well as implementation of the acquisition career management requirements set forth in the DAWIA legislation.

The DISC4 provides staff support to the AAE in managing the research, development, and acquisition of automated information systems (AIS) (includes automation, telecommunications, and command and control) and information technologies (IT). The DISC4 also serves as the Army's Chief Information Officer (CIO) as directed in the Information Technology Management Reform Act (ITMRA) of 1996. The CIO's primary responsibility, under ITMRA, is the management of resources for all Army information programs. The day-to-day management of Army acquisition programs is shown in Figure 11-3.

Similar to the DAE, the AAE develops Army acquisition policies and procedures and manages the Army's Production Base Support and Industrial Mobilization Programs.

The AAE, acts with the full authority of the SA is responsible for administering acquisition programs according to DOD policies and guidelines, and exercises the powers and discharges the responsibilities as set forth in *DODD 5000.1* for component acquisition executives. In addition, the AAE will:

- appoint, supervise and evaluate PEOs and direct-reporting PMs;
- coordinate with Office of the Deputy Chief of Staff for Operations and Plans (ODCSOPS), establish policy and guidance for Analysis of Alternatives (AoAs); for Acquisition category (ACAT) I and II programs, designate the organization responsible for performing system engineering trade-off analyses for the AoA; and provide issues and alternatives to ODCSOPS for inclusion in the AoA tasking document. ACATs are described in Figure 11-4;

Army Acquisition Executive (AAE)

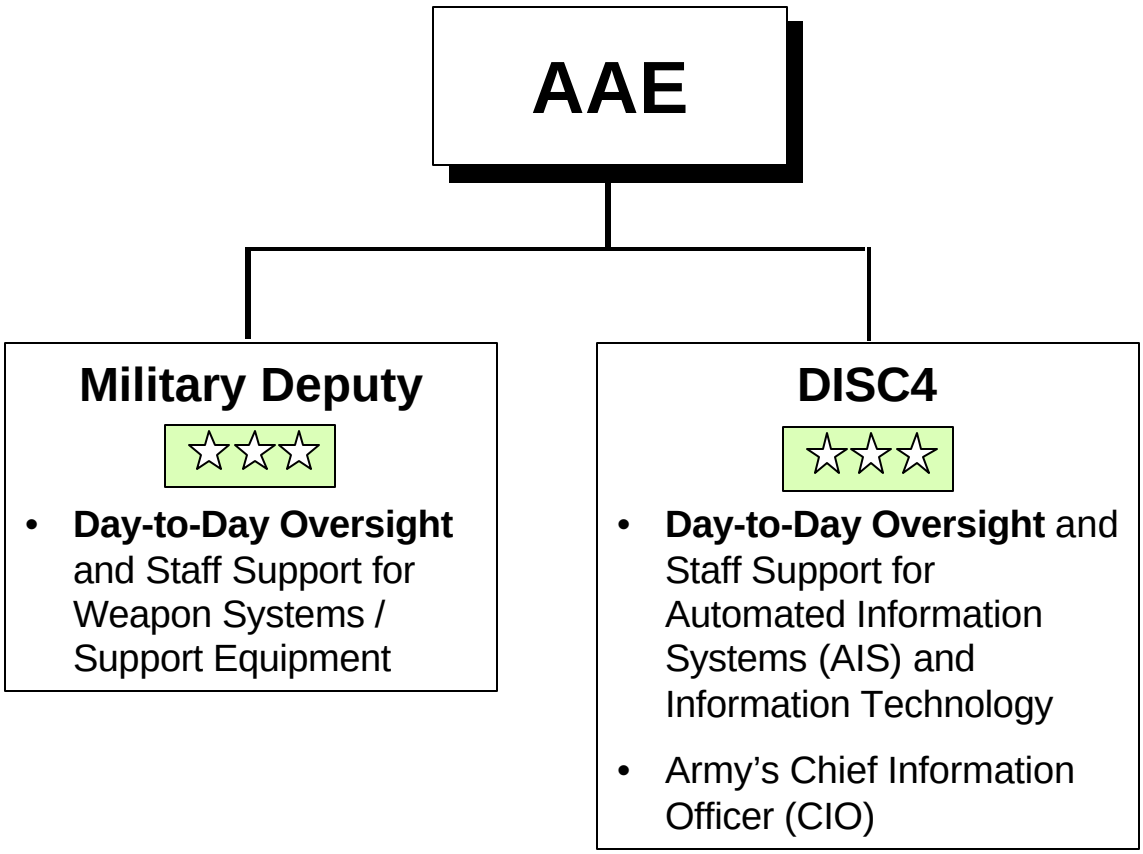


Figure 11-3

- develop guidance, in coordination with the ODCSOPS, and serve as co-proponent for the RDA Plan;
- formulate Army-wide S&T base strategy, policy, guidance, and planning;
- establish and validate Army Technology Base priorities throughout the planning, programming, budget, execution system (PPBES);
- approve and resource Army Advanced Technology Demonstrations (ATDs) and the Advanced Concepts and Technology II (ACT II) Program;
- co-chair all Army System Acquisition Review Council (ASARC) meetings with the Vice Chief of Staff, U.S. Army (VCSA);

Acquisition Categories

Program Category	Program Management	Primary Criteria	Milestone Review Forum	Milestone Decision Authority
ACAT I		**$ = FY 96 Constant**		
ACAT ID	PEO/PM	RDTE > $355M PROC > $2.135B	DAB	DAE
ACAT IC	PEO/PM	RDTE > $355M PROC > $2.135B	ASARC	AAE
ACAT IA				
ACAT IAM	PEO/PM	Single Year > $30M or Total Program > $120M or Total Life-Cycle Costs > $360M	DAB/ IT OIPT	DAE/CIO
ACAT IAC	PEO/PM	Single Year > $30M or Total Program > $120M or Total Life-Cycle Costs > $360M	Army ITOIPT	AAE/CIO
ACAT II				
ACAT II	PEO/MAT CMD DSA /PM	RDTE > $135M PROC > $640M	ASARC	AAE
ACAT IIA	PEO/MAT CMD DSA /PM	Single Year: $10-$30M or Total Program: $30-$120M or Total Life-Cycle Costs: $159-$360M	Army ITOIPT	AAE/CIO
ACAT III				
ACAT III	PEO/MAT CMD DSA /PM	High Visibility; Special Interest	IPR	PEO/MAT CMD DSA
ACAT IV				
ACAT IV	System Manager, or Equivalent	All Other Acquisition Programs (includes AIS)	IPR	MAT CMD CDR

Figure 11-4

- establish and implement Army Horizontal Technology Integration (HTI) policy;
- carry out all powers, functions, and duties of the SA with respect to the acquisition work force within the Army, subject to the authority, direction, and control of the SA;
- act as the final authority of all matters affecting the Army's acquisition system, except as limited by statute or higher level regulation;
- develop and promulgate acquisition, procurement, and contracting policies and procedures;
- appoint the source selection authority (SSA) for specified programs. *The Federal Acquisition Regulation (FAR)* is the primary contracting regulation. It is the first regulatory source to which DA acquisition personnel refer. The ASA (ALT) issues the *Army Federal Acquisition Regulation Supplement (AFARS)* to implement and supplement the *FAR* and the *Defense Federal Acquisition Regulation Supplement (DFARS)* and to establish uniform policies and procedures for use in the Army;
- review and approve, for ACAT ID programs, the Army position at each decision milestone before the DAB review. This includes the review and approval of Acquisition Program Baselines (APBs). The AAE also serves as the Milestone Decision Authority (MDA) for ACATs IC, II, and IIA and assigns the MDA for

ACAT III and IV programs. The MDA is the individual designated to approve entry into the next phase; this decision is made for each milestone used in a program; and

- approve the establishment and termination of all Program Management Offices (PMO) and PEOs. The AAE has authority to designate a system for intensive, centralized management and prescribe the appropriate level of management at any point in the program management process.

NOTE: ACAT IV is used by the Army and Navy only. ACATs are defined in DOD Regulation 5000.2R, Part 1.

DA System Coordinator (DASC). The DASC is the primary acquisition staff officer at DA. The DASC is responsible for the day-to-day support of his/her assigned program and serves as the PM's representative and primary point of contact (POC) within the Pentagon. Depending on whether the system or program falls within the purview of the DISC4 or ASA (ALT), the responsible DASC may report to either the Vice Director, Information Systems for Command, Control, Communications, and Computers (VDISC4) or the ASA (ALT), Deputy for Systems Management. The DASC is responsible for keeping the acquisition chain of command (ASA [ALT]) or DISC4) informed of the status of the assigned acquisition program. In addition, the DASC assists the PM in issue resolution at DA and OSD levels. The DASC is the "eyes and ears" of the PM at the Pentagon and ensures that the PM is advised of any actions or circumstances that might negatively impact their program.

The Program Executive Officer (PEO).

The PEO system structure was implemented by the Army in 1987 in response to requirements established by the *Goldwater-Nichols Reorganization Act of 1986,* and the recommendation of the Packard Commission which the President approved and then ordered by *NSDD 219* (Figure 11-5). The PEO and direct-reporting PMs serve as materiel developers (MATDEVs). The PEO, administering a defined number of AAE assigned major and/or non-major programs, is responsible for making programmatics (materiel acquisition cost, schedule, and total system performance) and for the planning, programming, budgeting, and execution necessary to guide assigned programs through each milestone. In addition, the PEO provides program information to the AAE, HQDA, DOD, and Congress; defends assigned programs to Congress through the Army Legislative and Budget Liaison Offices; and participates in the development of data to support AAE programmatic decisions in the PPBES. Other PEO and direct-reporting PM responsibilities include assisting the combat developer (CBTDEV) and training developer (TNGDEV) in developing operational requirements documents (ORDs) by providing technical, availability, performance, anticipated materiel acquisition cost, and schedule type information as needed.

The AAE currently has six PEOs—Air and Missile Defense; Aviation; Command, Control, and Communications Systems; Intelligence and Electronic Warfare; Ground Combat and Support Systems (GCSS); and Tactical Missiles—responsible for the intensive management of RDA weapon and information

systems. The PEO STAMIS organization transferred to Army Materiel Command (AMC) at the end of FY 98. Programs within the STAMIS organization were assigned to U.S. Army Communications-Electronics Command (CECOM).

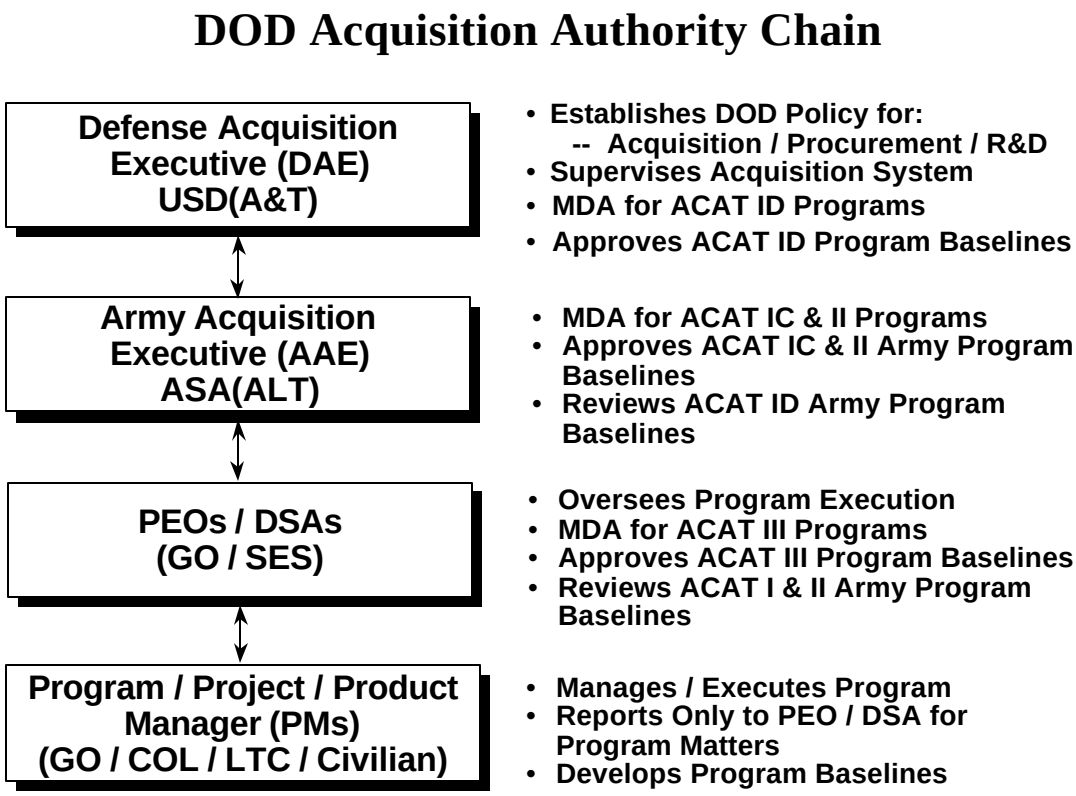


Figure 11-5

To support the expanded acquisition mission within AMC, the SECARMY approved the establishment of three new brigadier general positions titled, "Deputy for Systems Acquisition (DSA)." The new positions are located at the U.S. Army Communications-Electronics Command (CECOM), Fort Monmouth, NJ; the U.S. Army Tank-automotive and Armaments Command (TACOM), Warren, MI, and the U.S. Army Aviation and Missile Command (AMCOM), Redstone Arsenal, AL. The new DSAs develop command policy and plans, and manage the integration, coordination, and execution of systems acquisition and project management missions. The DSA positions have full line authority of the AAE and the appropriate AMC Major Subordinate CG in carrying out systems acquisition and project management activities.

The CBTDEV, referred to above, is the U.S. Army Training and Doctrine Command (TRADOC). TRADOC formulates and documents operational concepts, doctrine, organizations, and/or materiel requirements (MNSs, CRDs, and ORDs) for assigned mission areas and functions. The CBTDEV serves as the user representative during acquisitions for their approved materiel requirements as well as doctrine and organization developments.

A MATDEV is the RDA command, agency, or office assigned responsibility for the system under development or being acquired.

The term may be used generically to refer to the RDA community in the materiel acquisition process (counterpart to the generic use of CBTDEV).

A TNGDEV is a command or agency that formulates, develops, and documents or produces training concepts, strategies, requirements (materiel and other), and programs for assigned mission areas and functions. TNGDEV serves as user (trainer and trainee) representative during acquisitions of their approved training materiel requirements (MNS, CRDs, and ORDs) and training program developments. They perform the following functions solely in support of training systems:

- fund and conduct concept formulations for all system training aids, devices, simulations and simulators (TADSS) in support of assigned system;
- embed system-training capabilities into assigned materiel systems in accordance with the approved system ORD and in coordination with the CBTDEV/TNGDEV;
- develop, acquire, and field the subsystem training package with the materiel system;
- plan and program resources for the execution of new equipment training (NET) using Distance Learning (DL) technology and/or contract NET as the desired training strategy in support of TRADOC developed/approved system training plan (STRAP);
- program and budget resources for TADSS as specified in the training support requirements (TSR) annex of the ORD;
- program and budget resources to support and ensure attention to and integration of MANPRINT in the research, development, test, and evaluation (RDTE) and acquisition processes;
- provide TNGDEV perspective through input to the RDA Plan and the Army Modernization Plan (AMP);
- lead the cost performance Integrated Product Team (CPIPT) to institute the cost as independent variable (CAIV) process beginning with the approval of the MNS;
- conduct a crosswalk, with the CBTDEV (TNGDEV for TADSS), of the ORD to the request for proposal (RFP) to verify that the RFP, to include system specification or purchase description and the statement of work (SOW), accurately reflects the operational requirements stated in the ORD for all programs. The MATDEV and CBTDEV (MATDEV and TNGDEV for TADSS) will formally certify that the RFP has been crosswalked with the ORD and is in agreement prior to the ASARC or program review.

The Program/Project/Product Manager (PM).

The program management approach to materiel acquisition management is a distinct departure from the Services' traditional practice of establishing functionally oriented organizations to carry out well-defined, repetitive, and continuous long-term tasks. Organization for program management is a tailored, task-oriented process. This approach requires the program manager to establish management arrangements among the PM Office (PMO), other military organizations, and various contractors to coordinate their efforts

and to accomplish program objectives effectively, efficiently, and economically. A variety of PMO organizations have been established. They operate on the matrix management principle and must draw all functional support from a host command or installation. In addition to the formal PM organization, the PM directs the informal MATDEV/CBTDEV team to execute the assigned materiel acquisition program. MATDEV/CBTDEV team is the terminology used to describe the informal, but essential close working relationship among the MATDEV, CBTDEV, and other players in the RDA management process (Figure 11-2).

The PM has authority and responsibility for all programmatic cost, schedule, and performance decisions to execute the assigned program within the approved acquisition program baseline (APB) and subject to functional standards established by regulation, Secretarial direction, or law. Generically, all PMs are program managers, but they are chartered as a Program Manager, a Project Manager, or Product Manager based on the value and importance of the program they manage. The criteria established for designation of a Program Manager are generally the same as those which cause a system acquisition to be designated as a major program—high defense priority, high dollar value, or high Congressional or OSD interest. Most Program Managers report to a PEO and to the AAE. Project and Product Managers report to a Program Manager or a PEO. The Army also has many PMs who report to U.S. Army Materiel Command (AMC) and U.S. Army Space and Missile Defense Command (SMDC). Their programs are usually more mature systems or programs that have been through production and fielding. As a general rule, a program manager is a general officer or Senior Executive Service (SES); a project manager is a colonel or GS-15; a product manager is a lieutenant colonel or GS-14.

NOTE: This distinction between PMs is unique to the Army and does not apply to the other Services or within industry.

PEO Resource Control.

The Army has revised its resource support system structure for the PEOs to improve their control over the funding and manpower resources they need to carry out their responsibilities. PEOs and subordinate PMs receive dollars and personnel authorization resources directly from HQDA rather than through the materiel commands. The materiel commands continue to provide a variety of support services without duplicating any of the PEOs or PMs management functions. This enhanced resource control system ensures PEO and PM-managed programs operate as centers of excellence, managed with modern efficient techniques, without administrative burdens or materiel command layers being inserted into the chain of command.

Acquisition Career Management.

The MILDEP to the ASA (ALT) serves as the Army's Director, Acquisition Career Management (DACM). The DACM is assisted by the Deputy Director, Acquisition Career Management (DDACM) and the Acquisition Career Management Office in OASA (ALT). The Deputy Assistant Secretary of the Army (Civilian Personnel Policy) and the Deputy Chief of Staff for Personnel work closely with the DACM in implementing the requirements and intent of DAWIA for the Army.

The Army Acquisition Corps (AAC) was established for both military and civilian personnel and is a subset of the entire Army Acquisition Workforce (AAW). The AAW consists of those personnel who work directly with acquisition in the various acquisition career fields at the CPT/GS-5 and above levels. The AAC consists of military and civilian personnel at the rank/grade of MAJ/GS-13 and above who have met the statutory requirements for experience, education and training. Current Army policy focuses on accessing individuals at the GS-14 and above level into the AAC. All AAW positions at rank/grade of LTC/GS-14 and above are designated Critical Acquisition Positions (CAPs) and must be occupied by AAC members. For program management and contracting positions, statute or regulation further dictates education, training, and experience requirements which must be met prior to placement of an individual in these positions.

AAC Vision. The strategic vision for the AAC forms the foundation for all policies and initiatives impacting the AAW. This vision is to develop *"a small premier professional corps of acquisition leaders willing to serve where needed and committed to developing, integrating, acquiring and fielding systems critical to decisive victory…for the 21st century."* The vision focuses on *"a small premier professional corps of acquisition leaders...It is these leaders the Army must develop early in their careers to ensure they possess the requisite experience and skills to successfully manage the acquisition challenges of the 21st century."* The key to developing the best possible leaders for the Army lies in educating the workforce, particularly at the lower levels, as to the DAWIA requirements and the policies, procedures, and tools available to meet those requirements.

Career Development as a Mission. The leader development career pattern for an AAC officer is clearly defined and highly rewarding. Military acquisition career development is covered under *DA Pamphlet 600-3, Commissioned Officer Professional Development and Utilization*. An officer should normally serve eight years in branch qualifying assignments prior to entering the AAC. Upon AAC selection, the officer will attend Functional Area (FA) specific military training courses, and selected officers will have the opportunity to attend Advanced Civil Schooling (ACS). Attendance at ACS is contingent on the officer's manner of performance, potential for academic success, and support of his/her career time line. Graduate level education opportunities are an important part of career development within the AAC. However, job experience and strong performance across a variety of acquisition positions remains the key indicator for success. Recent initiatives seek to increase developmental acquisition experience opportunities while providing improved support for alternative advanced degree schooling. AAC officers compete for product/project management or acquisition command positions in the same manner as field commands. AAC LTCs and COLs are ineligible for selection to non-acquisition command positions.

For career development of civilians, the Army has developed a civilian acquisition career model as well as a matrix of quality achievement factors as a "roadmap for success." The focus of the career model is to begin to develop acquisition leaders and managers early in their careers, giving them a broad-based knowledge of the various acquisition functions supported by leadership

and management experience. The quality achievement factors are the combination of training, education, and experience at the higher grade.

Headquarters, Department of the Army Elements.

Chief of Staff of the Army (CSA). The CSA is responsible by law to the SA for the efficiency of the Army and its preparedness for military operations. The CSA acts as the agent of the SA in carrying out the plans or recommendations submitted by the ARSTAF and approved by the SA. The Vice Chief of Staff (VCSA) supports the CSA by managing the day-to-day operations of the Army, and specifically in the area of RDA, co-chairs the ASARC with the AAE.

The Assistant Vice Chief of Staff of the Army (AVCSA) develops and articulates Army warfighting requirements, integrates requirements into the overall planning and programming process, and helps the Army better compete for modernization funding in the Joint arena.

Deputy Under Secretary of the Army (Operations Research). The DUSA (OR) establishes, reviews, and supervises Army T&E policy and procedures; oversees all Army T&E associated with RDA, as well as combat development programs; provides staff management (policy formulation, program direction, and resource oversight) of all T&E programs of interest to OSA; approves all Test and Evaluation Master Plans (TEMPs) requiring HQDA approval; and is responsible for all software development for modeling and simulations and software T&E policy.

Assistant Secretary of the Army (Financial Management and Comptroller) (ASA[FM&C]). The ASA(FM&C) has secretariat responsibility for all financial management activities and operations for appropriated funds. While the budget is in preparation, the ASA(FM&C) receives and consolidates procurement and RDT&E budget forms from MACOMs and PEOs. The ASA(FM&C) also:

- represents the AAE on all cost and economic analysis matters related to the acquisition process;
- carries out all financial management responsibilities assigned under Title 10;
- tasks the appropriate CBTDEV or MATDEV to conduct program office estimates (POE) and/or economic analyses (EA) to milestone decision review (MDR) and PPBES requirements;
- manages all budgeting activities in support of the Army materiel requirements processes and RDA modernization program, with the framework of PPBS/PPBES; and,
- provides oversight, review and approval for all costing and economic analysis efforts, as carried out by the U.S. Army Cost and Economic Analysis Center (CEAC) within the Cost and Economic Analysis Program to include preparation of the Component Cost Analysis (CCA).

For ACAT I and special interest programs the ASA (FM&C) establishes a Army Cost Review Board (CRB) of senior leadership to review the life-cycle cost estimates and recommend the Army Cost Position (ACP). The ASA(FM&C) Deputy for Cost Analysis ensures that the ACP reflects the

costs and risks associated with the program in concurrence with the cost as independent variable (CAIV) process.

Assistant Chief of Staff for Installation Management (ACSIM). The ACSIM is responsible for developing criteria for the mitigation of environmental impacts, and reviewing emerging Army RDA systems for environmental effects.

Director of Information Systems for Command, Control, Communications, and Computers (DISC4). The DISC4 is the Army's chief information officer (CIO) and has ARSTAF responsibility and serves as the military deputy (MILDEP) to the AAE for Army AIS and IT activities. These include establishing and approving policies, procedures, and standards for the planning, programming, life-cycle management, use of Army IT resources, and responding to and validating all warfighting requirements. The DISC4:

- validates all IT related to MNS, ORD, and Operational Need Statement (ONS) by ensuring that they meet three criteria:
    1. they conform with the Army Technical Architecture (ATA) and address integration into Army Enterprise Architectures;
    2. the requirement has gone through business process reengineering (BPR);
    3. they are in concert with emerging command, control, communications, computers, and intelligence (C4I) technologies.
- has overall responsibility for Army software policy for both AIS and weapon systems.
- oversees the activities of PEOs or PMs managing command, control, communications, and computer and IT acquisition programs.
- provides technical oversight for both AIS and weapon systems on software and IT matters during the acquisition approval process.
- directs and approves standards for data and interoperability of products, to include joint and combined programs.
- provides software R&D advice and management oversight for all systems during the ASARC and the Information Technology (IT) Overarching Integrated Product Team (OIPT).
- reviews materiel system programs and warfighting rapid acquisition program (WRAP) candidate systems for compliance with HQDA policy for software reuse, technical and systems architectures, data element standardization, post production software support, spectrum management, and Ada software initiatives.
- ensures proper implementation of the ILS and MANPRINT programs in IT.

Director of Program Analysis and Evaluation (DPAE). The DPAE is responsible for reviewing and analyzing requirements and programs in force structure development, providing analytical support to the Army Resources Board (ARB) and subordinate committees, developing resource guidance, developing and compiling the Program Objective Memorandum (POM), maintaining the Army portion of the DOD Future Year Defense Program (FYDP), and presenting an affordability analysis to the ASARC and ITOIPT. The DPAE is a regular member of the

ASARC. Other responsibilities include conducting and presenting affordability assessments to support DOD and HQDA ACAT I programs and managing the programming phase of the PPBES.

Deputy Chief of Staff for Operations and Plans (DCSOPS). The DCSOPS has primary ARSTAF responsibility for the prioritization and validation of both materiel quantitative and performance requirements. DCSOPS develops broad force requirements and issues guidance for the combat developments programs to include establishing materiel objectives and requirements, overall force structure design, and Basis of Issue Plans (BOIP). DCSOPS provides guidance and reviews results of AoAs, establishes priorities for materiel development for designating major Army programs, and is a regular member of the ASARC. Other DCSOPS responsibilities include:

- developing Army policy and guidance for materiel requirements and combat development programs. This includes the requirements determination process, prioritization, resourcing, and integration of materiel warfighting requirements;
- establishing and validating Army priorities throughout PPBES to include RDA programs;
- coordinating force modernization activities, develop modernization plans, and monitor the impact of force modernization planning and execution for the total Army, with the assistance of ASA(ALT);
- conducting force feasibility reviews (FFRs) to assess supportability and affordability for structure, manpower, equipment, dollars, facilities and training;
- serving as the co-proponent, with the ASA(ALT), for the Army RDA Plan;
- assisting the ASA(ALT) in preparing acquisition program documentation, and adjustments for programming and budgeting;
- forwarding MNSs and CRDs for potential ACAT I programs to the JROC for validation. Forwards ACAT I ORDs to JROC for validation of key performance parameters (KPPs) and assignment of approval authority;
- establishing policy and guidance for cost, schedule, and performance trade-off analyses;
- establishing DA policy and guidance for and validating and approving field commander's ONSs;
- assigning catalog of approved requirements documents (CARDS) reference number, and maintaining and publishing CARDS;
- co-chairing the WRAP ASARC;
- reviewing and evaluating requirements based on issues raised by other Services, the Joint staff, and OSD and recommending changes to CDR, TRADOC;
- serving as the Army advocate on JROC issues. Providing coordination, liaison, and integration across the ARSTAF, MACOMs, the Joint Staff, and CINC representatives for the Army JROC effort;
- providing ARSTAF oversight of the development of the operational architecture (OA) IT and requirements as well as synchronizing the technical and systems architectures;
- ensuring horizontal technology integration (HTI) policies and procedures are implemented and

followed in the requirements prioritization process;

- providing representative to the Army science and technology reviews and management teams.

Systems Integrator (SI). Within ODCSOPS, the SI is the focal point for materiel requirements and the CBTDEV's primary representative and point of contact (POC) in the Pentagon. The SI provides the continuous coordination necessary to ensure the integration of new warfighting materiel systems into Army organizations. SIs are appointed by the Assistant Deputy Chief of Staff for Operations and Plans-Force Development (ADCSOPS-FD) during the first phase of the acquisition system management process.

The SI integrates operational, training, doctrinal, organizational, personnel, logistical, and test and evaluation aspects to ensure the fielding of a complete, coordinated, and supportable system. The SI ensures that systems are doctrinally based and that they are properly reflected in approved Tables of Organization and Equipment (TOEs). SI's duties include developing a DA position on proposed materiel requirement documents and BOIPs and identifying, in coordination with Operational Test and Evaluation Command (OPTEC), the required operational and force development tests.

The SI monitors the progress of an assigned system throughout its developmental process to ensure that approved materiel requirements are staffed and satisfied. In addition, the SI ensures necessary logistical support, manpower spaces, and training packages are available when and where the system enters the inventory. The overall objective is to meet the First Unit Equipped (FUE) / Initial Operational Capability (IOC) dates with an operationally suitable, reliable, maintainable, and economically obtainable system. The FUE is the date when the system and associated equipment is fielded (in operational quantities complete with logistical support, and training support) to the IOC unit and new equipment training (NET) is accomplished. The IOC is the first attainment of warfighting capability of MTOE and supporting elements to operate and support a fielded RDA system.

The SI is also responsible for the management of requirements which result from the introduction of a system. Budget constraints and manpower ceilings make effective management of those requirements imperative. Identifying, monitoring, recording, and coordinating the data connected with force structure requirements is a complex task which requires a thorough understanding of the procedures, techniques, methods, and various management systems used in the requirements process. The SI works in close cooperation and coordination with his counterparts at TRADOC and the HQDA Staff.

Deputy Chief of Staff for Logistics (DCSLOG). The DCSLOG assesses the logistical supportability of materiel systems during the system acquisition process through management of the ILS program. DCSLOG participates in all phases of the RDA management process to ensure equipment is logistically reliable, supportable, and maintainable. DCSLOG is also responsible for secondary item requirements including secondary item war reserve requirements. The DCSLOG is a regular member of the Army Systems Acquisitions Review Council (ASARC).

The *DA Logistics Support Officer (DALSO)* is the HQDA representative of the

logistics community, providing logistics coordination. The DALSO monitors the progress of the assigned system and ensures that all elements of ILS, as outlined in *AR 700-127,* are satisfactorily completed. Because of the interrelationships of assigned responsibilities in materiel acquisition, close and continuous coordination and cooperation is essential between the DALSO and his counterparts at TRADOC, AMC, and the HQDA Staff.

In addition to new items of equipment, DALSOs also have responsibility for existing weapons and materiel systems in the Army force structure. This responsibility covers all phases of logistics support to include readiness, redistribution, and disposal.

The DALSO's primary mission is to provide HQDA general staff supervision over the ILS management of assigned commodity materiel/weapons systems from concept to disposal. Other responsibilities include:

- taking ARSTAF responsibility for logistical acceptability and supportability of materiel systems, interoperability, ILS, materiel release, and logistics R&D programs for the Army;
- establishing the HQDA logistic position concerning acceptability, deployability, and supportability for all acquisition programs;
- serving as the logistician in the materiel acquisition process for other than medical equipment, and conduct surveillance over logistics aspects of materiel acquisition and modification programs to ensure supportable systems;
- providing policy guidance for logistics for medical and engineer materiel acquisition.

Deputy Chief of Staff for Personnel (DCSPER). The DCSPER has ARSTAF responsibility for personnel management. DCSPER monitors planning for the manpower and personnel aspects of new systems. Also, the DCSPER is the proponent and has primary ARSTAF responsibility for the DOD Human Systems Integration (HSI) program (called the Manpower and Integration (MANPRINT) program in the Army). The emphasis of the MANPRINT program is to enhance total system performance (soldier in the loop) and to conserve the Army's manpower, personnel and training (MPT) resources. The DCSPER is a regular member of the ASARC.

The *DA Personnel Staff Officer (PERSSO)* is the ARSTAF representative of the personnel community. The PERSSO provides for the continuous coordination necessary to ensure the smooth integration of new equipment, materiel systems, and new organizations. The PERSSO responsibilities include, but are not limited to: preparing and justifying force structure requests in conjunction with the organization integrator (OI) and SI; reviewing and coordinating the development of force structure changes; personnel supportability architecture, officer and enlisted issues related to new organizational concepts and doctrine; and ensuring programming and budgeting of manpower spaces. The PERSSO participates in all HQDA actions to develop the staff position on CBTDEV proposals for new major systems (mission need determination), the designation of a proposed system as major or nonmajor, the recommendations on the elements of system fielding including the proposed Basis of Issue Plan (BOIP), the Initial Issue Quantity (IIQ), and the Army Acquisition Objective (AAO). The PERSSO represents the DCSPER at force modernization-related, HQDA-sponsored conferences, forums, and

meetings on issues of supportability concerning the introduction of new and/or reorganized existing TOE/TDA units.

Deputy Chief of Staff for Intelligence (DCSINT). The Deputy Chief of Staff for Intelligence (DCSINT) provides scientific and technical intelligence and threat projections in support of all aspects of the Army RDA programs.

In addition, a *Threat Integration Staff Officer (TISO)* is designated by the DCSINT to function as the HQDA threat integration coordinator for designated mission areas, programs, and systems. The TISO represents the DCSINT on all aspects of threat support throughout the system life-cycle or study process. The TISO system complements the ODCSOPS SI and is designed to foster closer coordination among the intelligence community, MACOMs, and ARSTAF agencies to ensure the timely integration of the threat into the materiel acquisition process. The TISO system supplements existing management procedures but does not relieve ARSTAF agencies and MACOMs of established responsibilities. The DCSINT is the approving authority for either establishing or ending TISO monitorship of systems. Generally, all programs designated as Army major or non-major systems will be assigned to a TISO for monitorship on an as-required basis with approval of the DCSINT.

The Surgeon General (TSG). TSG has ARSTAF responsibility for medical research, development, test and evaluation, and is the Army medical MATDEV. The TSG is also responsible for the medical aspects of all other development and acquisition programs ensuring mission area interface with CBTDEVs. The TSG serves as a member of the ASARC and ITOIPT for medical issues, including health hazard assessment, personnel safety, and hazards remediation. Other responsibilities include:

- developing policy, responsibilities, and procedures to ensure implementation of systems acquisition policy as it applies to combat medical systems, medical readiness and health care programs, and other assigned Army and joint service requirements;
- assigning support responsibilities for medical materiel development and acquisition to agencies and activities under TSG command and control;
- recommending to TRADOC materiel requirements and associated priorities for medical readiness and health care programs; and
- establishing mission area interface with TRADOC for all medical programs, ensuring that requirements and interests of each participating service are provided full consideration in medical programs for which the Army has lead agency or executive agency responsibility.

Chief of Engineers (COE). The COE monitors requirements and research and development necessary to provide construction design criteria, construction techniques, and construction material for the Army, Air Force, and other government agencies. The COE provides fixed-facility concealment, camouflage, and deception; real estate management techniques; and engineering support for maintenance of installation and facilities. It is the COE's mission to preserve and improve environmental quality associated with construction and facilities and Army environmental quality and R&D activities covering atmospheric, terrestrial, and

topographical sciences. The COE is also responsible, under the general direction of the AAE, for the RDTE of fixed and floating power systems, and high voltage generation applications (to include nuclear applications).

The COE reviews all emerging Army systems for digital terrain data requirements and environmental effects such as climate, terrain, or weather. The review also includes minimization of toxic and hazardous wastes and those hazardous wastes associated with normal system test, operation, use, and maintenance.

The General Counsel (GC). The GC advises the AAE and the ASARC on any legal issue, which arises during the acquisition of a weapon or materiel system. The GC reviews all Army acquisition policy and supervises all attorneys providing legal advice relating to programs within the Army RDA management system. He is also responsible for all legal advice in the negotiation, oversight, and review of international cooperative RDA programs.

Army Digitization Office (ADO). The Director, Army Digitization Office (ADO) responsibilities include:

- overseeing and coordinating the integration of Army Battlefield activities;
- providing to the leadership guidance and assistance in acquisition matters relating to digitization;
- overseeing migration of all programs to compliance with the Army Technical Architecture (ATA);
- developing, maintaining, and publishing the Army Digitization Master Plan (ADMP);
- recommending, maintaining, and updating planned digitization program funding by use of a digitization MDEP consistent with the ADMP;
- advising the Army leadership on all matters concerning integration of digitization across the force.

NOTE: The ADO is currently OPCON under the Deputy Chief of Staff for Operations and Plans - Force Development (DCSOPS - FD).

Major Commands (MACOMs).

Military Traffic Management Command (MTMC). MTMC provides transportability engineering advice and analyses to the MATDEV, CBTDEV and TNGDEV; provides item, unit, and system transportability assessments for MDR; provides transportability approval or identify corrective actions required to obtain approval for all transportability problem items; and reviews all materiel requirements documents to assess adequacy of transportability.

U.S. Army Medical Command (MEDCOM). MEDCOM is the medical CBTDEV, TNGDEV, trainer, user representative, and operational tester. MEDCOM conducts medical combat and training development activities as assigned by CG, TRADOC and TSG; reviews and evaluates materiel and TADSS requirements documents to identify and assure that adequate consideration is given to the prevention of health hazards from operating or maintaining materiel systems, and conduct the health hazard assessment (HHA) program, as required; conducts and supports assigned operational T&E; and forwards all medical warfighting concepts and requirements documents to TRADOC for review and approval.

U.S. Army Intelligence and Security Command (INSCOM). INSCOM is

the CBTDEV for strategic signals intelligence (SIGINT) systems and INSCOM sole-user intelligence, electronic warfare (EW) systems used for formulating doctrine, concepts, organization, materiel requirements, and objectives. INSCOM responsibilities include:

- preparing requirements documents and serving as the Army CBTDEV during development and fielding of new SIGINT and information security (INFOSEC) systems under the purview of the National Security Agency (NSA) and having sole application to U.S. SIGINT and INFOSEC systems. INSCOM forwards warfighting concepts and requirements documents to TRADOC for review and approval.
- coordinating with the PEO or MATDEV on matters pertaining to acquisition of INSCOM sole-user SIGINT and intelligence, security and electronic warfare (ISEW) systems.
- coordinating with the CG, TRADOC, on requirements determination for other INSCOM sole user ISEW systems and conduct combat and training developments for these Army systems when directed by HQDA, and/or Director, Central Intelligence (DCI), or at the request of CG, TRADOC.
- ensuring documentation of requirements for training support products, system TADSS, and/or embedded training for INSCOM systems.
- providing threat documentation to TRADOC as validated and approved by HQDA DCSINT.
- recommending to CG, TRADOC materiel requirements and associated priorities for strategic intelligence and security readiness.

U.S. Army Materiel Command (AMC). AMC performs assigned materiel and related functions for research and development, developmental testing, acquisition and logistics support of materiel systems, and other materiel acquisition management functions required by DA. AMC is a principal MATDEV in the Army. The CG, AMC is a regular member of the ASARC. The AMC mission, in support of RDA, is to:

- equip and sustain a trained, ready Army.
- provide development and acquisition support to MATDEVs (PEOs, DSAs, and PMs).
- provide equipment and services to other nations through the Security Assistance Program.
- develop and acquire non-major systems and equipment.
- define, develop, and acquire superior technologies.
- maintain the mobilization capabilities necessary to support the Army in emergencies.
- conduct developmental tests for Army materiel systems; verify system safety; develop test technology; support operational test and evaluation; and participate in the continuous evaluation process.
- exercise delegated authority, under ASA (ALT) oversight, in the following areas: metrication; design to cost; production readiness reviews; manufacturing technology, standardization; acquisition streamlining; reliability, availability, and maintainability; quality; risk management; value engineering; parts control; and industrial modernization improvement.

- provide survivability, vulnerability, or lethality assessments and survivability enhancement expertise for all Army materiel programs.
- evaluate and recommend improvements to the industrial base.
- as a MATDEV, be responsible for the RDTE, the acquisition, and logistics support of assigned materiel in response to approved materiel requirements.
- plan, coordinate, and provide functional support to PEOs, DSAs, and PMs. Support includes, but is not limited to, procurement and contracting, legal, managerial accounting, cost estimating, systems engineering, conducting system TADSS and embedded training concept formulation, developmental test, logistics support analyses, MANPRINT, environmental, intelligence and threat support, configuration management, and conducting various independent assessments and analyses.
- provide overall management of the Army's technology base (less Class VIII), including identification of maturing technologies necessary to support acquisition of warfighting materiel systems.
- provide RDA science and infrastructure information to HQDA for the Army RDA Plan.
- conduct a crosswalk, with the CBTDEV (TNGDEV for TADSS), of the ORD to the request for proposal (RFP) to verify that the RFP, to include system specification or purchase description and the statement of work (SOW), accurately reflects the operational requirements stated in the ORD for all programs. The MATDEV and CBTDEV (MATDEV and TNGDEV for TADSS) will formally certify that the RFP has been crosswalked with the ORD and is in agreement prior to the ASARC or program review.
- provide initial and updated cost and system performance estimates for battlefield and peacetime operations as inputs to supporting analysis and program decisions.

U.S. Army Training and Doctrine Command (TRADOC). TRADOC is the Army's primary "user representative" in the materiel acquisition process. TRADOC performs assigned materiel and related functions for operations research and analysis, evaluation of products of the requirements determination process, operational and organizational planning, logistics support planning, and quantitative and performance requirement specifications for materiel systems, and other combat development functions required by DA. As the Army's principal CBTDEV, TRADOC guides, coordinates, and integrates the total combat development effort of the Army. Combat developments are a major component of force development and encompass the formulation of concepts, doctrine, organization, materiel objectives, requirements, and operational test and evaluations (OT&E) of products of the requirements determination process.

The CG, TRADOC is a regular member of the ASARC. As the Army's primary CBTDEV/TNGDEV, TRADOC is the Army's *architect for the future* and is charged to chart the course for the Army. In doing this, CG, TRADOC:

- guides and disciplines the requirements determination process by:

  - providing requirements determination and documentation procedures and process guidance for the entire Army;
  - establishing and implementing horizontal requirements integration (HRI) policy;
  - approving all Army warfighting requirements prior to their submission to HQDA;
  - approving integrated concept team (ICT) minutes or reports containing proposing solution sets for future operational capabilities (FOCs); and,
  - approving MNSs and ORDs produced by the Army community and forward to DCSOPS for prioritization and resourcing.
- assists DA to prioritize and justify warfighting requirements by:
  - determining applicability of ONS to future Army-wide requirements and assign to a proponent for requirement documentation;
  - providing insights and descriptive information for materiel programs; and
  - supporting ODCSOPS by presenting documents and information to the JROC and JWCA and assisting in issue resolution.
- coordinates and integrates the total combat/training developments efforts of the Army by:
  - providing, with appropriate support from other MACOMs, the future warfighting vision, capstone warfighting concept and FOCs, the start point for requirements determination process;
  - developing and maintaining the C4I operational architecture (OA);
  - being the primary source for determining need for and preparing requirements and requirements documents for TADSS and embedded training; and
  - determining need for and obtain CSA approval for conduct of Advance warfighting experiments (AWEs).
- conducts AoA for ACAT I, IA, II, and IIA programs when required by HQDA. When required by the MDA, conduct AoA for all other ACAT programs.
- serves as member of the Army S&T Advisory Group (ASTAG).
- provides representative to Army S&T reviews and management teams.

TRADOC is organized into integrating centers and mission area schools and centers. The principal integrating centers in the materiel acquisition process are the Combined Arms Center (CAC), Fort Leavenworth, and the Combined Army Support Command (CASCOM), Fort Lee. The mission area schools and centers are the branch schools and centers for Infantry, Armor, Field Artillery, Air Defense Artillery, Aviation, etc. The Directorates of Combat Developments (DCDs) at the TRADOC mission area school and centers work very closely with the PEO community and the AMC "commodity" MSCs in the RDA management process.

The TRADOC counterpart to the PM, the *TRADOC System Manager (TSM)*, is a central figure in the RDA process and a key member of the MATDEV/CBTDEV team. The TSM is chartered by the CG, TRADOC to

function as focal point for coordination of the CBTDEV/TNGDEV efforts in the development and acquisition of the system. The TSM is responsible to synchronize all DTLOS domains that are impacted by the fielding of a materiel system. TSMs are appointed for selected major and non-major programs. In some cases, a *TRADOC Program Integration Office (TPIO)* may be appointed for a family of systems such as ABCS, Combat ID, etc. A TSM/TPIO is appointed early in the development cycle, normally at the same time as the PM. He is usually located at the proponent school and center. For systems without an assigned TSM/TPIO, the DCD at the proponent school and center serves as the focal point.

NOTE: C4I operational architecture (OA) contains text, graphic models to show functions and information required, graphic representations of how the Army organizes and equips to execute C4 processes, and a database to provide detailed characteristics about information exchanges, such as format voice/data/ imagery, speed of service, perishability, and criticality. The OA shows relationships among organizations and functions in terms of the information they need, use, and exchange.

U.S. Army Special Operations Command (USASOC). In support of materiel systems RDA management, USASOC establishes mission area interface with TRADOC for all programs, ensuring that requirements and interests of each participating agency are provided full consideration in programs for which the Army has lead agency or executive responsibility, and serves as the special operations trainer and user representative. In addition, USASOC will:

- forward all non-SOC unique warfighting capability requirements and documents to CG, TRADOC for approval.
- forward SOC unique requirements documents to CG, TRADOC for review.
- monitor TRADOC projects and identify needs that affect the USASOC mission and responsibility.
- support TRADOC field activities, conduct and support testing, and monitor RDA projects to include potential force standardization and interoperability.
- participate in warfighting experiments, as appropriate.

U.S. Army Space and Missile Defense Command (USASMDC). USASMDC is the principal assistant and advisor to the SA and the CSA for all matters pertaining to space and strategic defense. The USASMDC is responsible for technology development programs related to strategic and tactical missile defense, space defense, and satellite technology. The command conducts missile defense technology base research and development activities in support of the Ballistic Missile Defense Organization (BMDO), assures transfer of technology between BMDO and Army systems, and provides matrix support to PEO Missile Defense. USASMDC is also chartered by CSA to be the operational advocate and focal point for theater missile defense (TMD) at Army level. The CG, USASMDC, assists in the development of Army TMD positions, reflective of work being done in TRADOC, and represents those positions at HQDA, OSD, BMDO, Joint Staff, Congressional, and other high-level forums.

Other DA Agencies.

Operational Test and Evaluation Command (OPTEC). OPTEC is a field operating agency (FOA) under the CSA. The CG, OPTEC is responsible for management of the Army's operational testing and evaluation, developmental evaluation, and Army participation in joint test and evaluation. Their evaluations of materiel systems operation effectiveness and suitability are independent of the CBTDEV/MATDEV and are reported directly to the MDR body. CG, OPTEC is a member of the ASARC and Chairman of the Test Schedule and Review Committee (TSARC). The TSARC is the HQDA centralized management forum for user (operational) T&E resources. OPTEC has assumed some of AMC's developmental evaluation missions and responsibilities as part of the Army's redesign efforts. OPTEC provides advice and assistance to the CSA, the VCSA, other members of the ARSTAF, and other elements of DA in regard to Army operational test and evaluation. Other responsibilities are to:

- review all draft materiel requirements documents for T&E implications.
- assist TRADOC (CBTDEV/TNGDEV) in developing evaluatable, operationally relevant, and totally system focused critical operational issues and criteria (COICs). Provide advice concerning methods and measures to evaluate the system against the COIC and advise on the resources and ability to test and evaluate the system.
- support the TRADOC AWE program and Concept Experimentation Program (CEP).

NOTE: OPTEC will be reorganized into the Army Test and Evaluation Command (ATEC) effective 1 October 1999, VCSA Memorandum, dated 18 November 1998.

U.S. Army Medical Research and Materiel Command (USAMRMC). USAMRMC is the medical MATDEV, logistician, and developmental tester and is responsible for RDTE, the acquisition, and logistic support of assigned materiel in response to approved materiel requirements. In addition, USAMRMC will:

- plan, program, budget, and execute medical RDTE tasks that support system RDA to include required system training support products, TADSS, and/or embedded training.
- plan, coordinate, and provide functional support to USAMRMC organizations. Support includes, but is not limited to, procurement and contracting, legal, managerial accounting, cost estimating, systems engineering, conducting system TADSS and embedded training concept formulation, developmental T&E, ILS, MANPRINT, environmental management, configuration management, and conducting various independent assessments and analyses.
- assist the medical CBTDEV/TNGDEV in the requirement determination process.
- review requirement documents to determine their adequacy and feasibility and for logistical support aspects of materiel systems to include ILS.
- develop and maintain the physiological, psychological, and medical data base to support the HHA, system safety

assessments (SSA), and human factors engineering analysis (HFEA).

- evaluate and manage the materiel readiness functions in the medical materiel acquisition process.
- function as TSG agency for the materiel acquisition of medical nondevelopmental items (NDI), commercial off-the-shelf (COTS) items, and sets, kits, and outfits.

U.S. Army Medical Department Center and School (AMEDDC&S). AMEDDC&S is the medical CBTDEV, TNGDEV, doctrine developer, and operational tester and evaluator. In addition, AMEDDC&S develops doctrine, organizations, and systems requirements within the guidelines established by the CG, TRADOC and in accordance with Army health care standards established by TSG.

MATERIEL REQUIREMENTS DETERMINATION PROCESS.

Policy.

DODD 5000.1 and DOD Reg 5000.2R provide mandatory DOD acquisition policy and procedures including materiel requirements documentation and approval guidance for major defense acquisition programs (MDAPs) for both materiel and automated information systems (AIS). *Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 3170.01* mandates policy and procedural guidance for the requirements generation system to include guidance on key performance parameters (KPPs), measures of effectiveness (MOEs), and the Joint Requirements Oversight Council (JROC). *AR 70-1* provides Army acquisition guidance for materiel and information systems. *AR 71-9* provides Army requirements determination and documentation policies and responsibilities implementing *DODD 5000.1, DOD Regulation 5000.2R and CJCSI 3170.01* supporting all Army acquisitions categories (ACAT) I through IV materiel and information systems. ACATs are shown in Figure 11-4.

NOTE: The terms materiel and materiel system in this chapter apply to materiel and information systems unless specifically identified otherwise.

The main governing policies are summarized below:

- The requirements determination process provides a current and future Army capable of success in any contingency from humanitarian assistance to full tactical operations in joint and combined environments. The process will be responsive to the urgent materiel requirements of the deployed warfighter as well as project the full set of doctrine, training, leader development, organizational design, materiel, and soldier (DTLOMS) requirements for the Army to be mission capable in near-, mid-, and far-term operations.
  - Field Commanders document and submit their urgent warfighting and training operational requirements and obtain support via the operational needs statements (ONS) process discussed in *AR 71-9, TRADOC Black Book #3 and TRADOC Pamphlet 71-9.*
  - Commanders with combat developments missions conduct continuing analyses identify and

define near- through far-term DTLOMS requirements.

- Future operational requirements for all DTLOMS domains will be related to the TRADOC approved Capstone operational concept and associated lower level concepts of operation. The current approved Capstone warfighting concept for the Army is Force XXI. Requirements not related to these warfighting concepts are not provided resources. TRADOC's integrated and approved listing of future operational capabilities (FOCs) from these concepts serve as a process control mechanism; authority for supporting studies and experimentation; and a device for linkage between requirements documentation and the concepts. FOCs are listed annually in *TRADOC Pamphlet 525-66*.
- Requirements determination is the work of Integrated Concept teams (ICTs), made up of people from multiple disciplines. Their efforts may include concept development or materiel operational requirements development and documentation. DTLOMS solution sets are documented in ICT minutes or reports. ICTs operate on principals similar to acquisition integrated Product teams (IPTs) in *DOD 5000.2R* to identify and resolve issues early. An ICT includes representatives of Army requirements process stakeholders and other principal contributors, including academia and industry, when appropriate. OSD, other services, CINCs, and Joint Staff are invited to send representatives, as appropriate, when their interest is known or suspected.
- A materiel requirement is developed for an approved FOC only after all other possible doctrine, training, leader development, or organizational solutions are deemed unable to solve the FOC. The priority order of consideration is doctrine, training, leader development, organizational design, and finally materiel. MNSs are prepared in accordance with *CJCSI 3170.01* format guidelines for those materiel operational requirements with ACAT I or IA program potential and other programs representing a new Army mission or a potential program using a significant leap ahead technology. ORDs are prepared in accordance with *DOD 5000.2R* format guidance.
- All ACAT I, IA, II, IIA, and III materiel programs have an ORD. ACAT IV materiel programs have ORDs, except ACAT IV base operations materiel that are not warfighting requirements. They can be procured following MACOM standard acquisition procedures.
- All IT products must comply with the Army's operations, systems, and technical architectures. MACOM information management offices review and ensure compliance with architectures.
- Standardization is a key focus of CBTDEVs/TNGDEVs throughout the requirements determination and acquisition management process. Properly applied, standardization can significantly reduce life-cycle costs, schedules, and risks, while improving quality and logistic support.
- Close coordination is maintained between CBTDEVs/TNGDEVs and

the science and technology (S&T) community to ensure that technology investments are appropriately focusing on identified FOCs. Periodic reviews are conducted with program offices, laboratories, users, and maintainers to assess the technical status, emerging performance, affordability, and remaining technology shortfalls. Modeling and simulation are used to preclude unnecessary and impractical development.

- All system developments have many capability characteristics that are defined in requirements documentation. KPPs are those system characteristics that define whether or not a system will be capable of mission accomplishment. KPPs are, by definition, characteristics that can cause a concept or system to be reevaluated and a program to be reassessed for restructuring or termination. All requirements documentation will contain KPPs, which will in turn be documented in the system acquisition program baseline (APB). For ACAT I systems, KPPs are validated and approved by the JROC even if the authority for the requirements document has been delegated to the component. TRADOC validates and approves other KPPs.
- When developing system characteristics and performance parameters, cost must be considered on an equal level. In other words, cost is treated as an independent variable along with others used to define a system. This concept - cost as an independent variable (CAIV) - does not preclude consideration and evaluation of a new high potential, leap-ahead but expensive DTLOMS technology.

Army Science and Technology.

The ultimate goal of the Army's S&T program is to provide the soldier with a winning edge on the battlefield. The accelerating pace of technological change continues to offer significant opportunities to enhance the survivability, lethality, deployability, and versatility of Army forces. High technology research and development is, and will remain, a central feature of the Army's modernization strategy. Key to this modernization strategy is the planned transition of promising technology developments into tomorrow's operational capabilities. Technology demonstrations (discussed later) which evolve into systems and system upgrades incorporated in the Army Modernization Plan (AMP) accomplish this transition.

The Army's Science and Technology (S&T) program is an integral part of materiel acquisition. The S&T program consists of three stages - basic research (6.1), applied research (6.2), and advanced technology development (6.3). The identifiers--6.1, 6.2, etc.--are commonly used for identifying funds; but they are also used as a shorthand technique by members of the R&D community to identify levels of research development. For example, instead of referring to some project as being "in applied research," it is often referred to as being "6.2". The 6.1, 6.2, and 6.3 categories are known as the "tech base". (A MNS is not required for 6.1, 6.2 programs, regardless of size.). Basic research (6.1) includes all efforts of scientific study and experimentation directed toward increasing knowledge and understanding in those fields related to long-term national security needs. Applied research

(6.2) includes all efforts directed to the solution of specific military problems, short of major development projects. Advanced technology development (6.3) includes all efforts directed toward projects, which have moved into the development of hardware for testing of operational feasibility. Recent initiatives, such as the DOD Advanced Concept Technology Demonstrations (ACTD), (discussed later in the chapter) obscure the distinction between S&T and development -- pre-and post-milestone I activities.

The Army Science and Technology Master Plan (ASTMP) is the strategic plan for the Army's S&T program. It is approved by the SA and the CSA. It is our S&T roadmap for achieving Force XXI. This plan is provided to government, industry, and academia to convey the Army's S&T vision, objectives, priorities, and corresponding strategy. This document is explicit, resource-constrained DA guidance to drive funding priorities and the S&T program as a whole. The ASTMP provides "top down" guidance from HQDA to all S&T organizations. It also provides a vital link between DOD technology planning and the Army's major commands and laboratories. The core of DOD's S&T strategy is to fuel and exploit the information technology explosion; conduct extensive and realistic demonstrations of new technology applications; and provide for early, extensive and continued involvement of warfighters in S&T demonstration programs. S&T programs must be responsive to numerous national security considerations.

A mainstay of the Army strategy for military technology is a viable in-house research capability. Laboratories and research, development, engineering centers (RDECs) are the key organizations responsible for technical leadership, scientific advancements and support for the acquisition process. Activities of these organizations range from basic research to the correction of deficiencies in field systems. Academia and industry as well as hands-on bench work contribute to the S&T mission. Technology insertion into major systems is accomplished via the flow of patents, data, design criteria, and other information into Technology Demonstrations (TDs) and Advanced Technology Demonstrations (ATDs), new designs, and fielded systems.

The Army is streamlining the in-house research infrastructure through laboratory consolidation and placing significantly greater reliance on other Services S&T investments. In an effort to make the Army's 21st century research and development efforts more efficient and effective the Lab 21 study was initiated. One of the key elements of Lab 21 was the creation of a world class "flagship" laboratory called the Army Research Laboratory (ARL). Independent Army laboratories have been consolidated into technical directorates under the ARL management umbrella. ARL is being converted to a federated laboratory system, aligning Army researchers with the best that industry and academia have to offer to support Force XXI.

Overall, the Army's Science and Technology Strategy and programs are committed to the maintenance of technological superiority, while preserving the flexibility to cope with a wide array of possible threat, technology, and budget environments. The Army's investment in S&T is paramount and is playing a greater role in acquisition than ever, particularly since the advent of DOD Advanced Concept Technology Demonstrations (ACTDs).

A series of reviews of current and proposed S&T activities guide focused research. The first is an annual assessment of all proposed Army-funded S&T projects. It is

conducted based on an appreciation of current capabilities, ongoing S&T activities and their applicability to the FOCs described earlier in the chapter in *TRADOC Pamphlet 525-66*. Building from the basic S&T project review, a list of the top 200 Army Science and Technology Objectives (STO) candidates--the Army's most important S&T projects--is generated. Based on formal developmental milestones and achievement measures, the Army Science and Technology Working Group (ASTWG) approves each STO, which is then listed in the Army Science and Technology Master Plan (ASTMP). The ASTMP and the AMP provide the basis for ATDs, which showcase a variety of advanced technologies and their potential military merit. In addition to advancing the technology, all of this in-house S&T activity assists the ICTs to better understand the "art of the possible" and refine the many requirements associated with them.

TRADOC Pamphlet 525-66 also guides independent research & development (IR&D) efforts. By providing the private sector an unclassified, descriptive list of desired FOCs, the Army is able to tap into a wealth of information and new ideas on different means to achieve those capabilities. The Army encourages industry to share these ideas with appropriate CBTDEV and TNGDEV organizations.

A special program--Advanced Concept and Technology II (ACT II) program--encourages the application/demonstration of mature technologies, non-developmental items (NDI), and/or prototypes to address highest priority FOC needs. ACT II funds proposed TDs which, if successful and compelling, may be selected for expedited acquisition or funded through the normal Army acquisition process. ACT II projects are funded at a maximum of $1.5 million with a planned period of performance not exceeding twelve months. The program is focused on applying mature technologies and unconventional concepts and approaches to address specific FOCs which are solicited annually through a Broad Agency Announcement (BAA). This approach shortens the acquisition cycle and reduces developmental costs. ACT II is sponsored by the CSA and ASA (ALT). TRADOC, AMC, and the Army Research Office (ARO) collaborate to build ACT II partnerships between the Army, industry, and the academic community.

As with some concepts, S&T research occasionally produces an item that is recognizable as a defined requirement that should be documented and resourced. Most S&T products must be evaluated in warfighting experiments before a decision is made to document them as materiel requirements.

Oversight of the S&T program is provided by the Army Science and Technology Advisory Group (ASTAG), which is co-chaired by the AAE and the VCSA (Figure 11-6). The ASTWG, is co-chaired by the Army S&T executive (the Deputy Assistant Secretary for Research and Technology) and the Assistant Deputy Chief of Staff for Operations and Plans (Force Development). The ASTWG provides general officer level resolution of pressing S&T issues prior to meetings of the ASTAG; recommends to the ASTAG revisions to the Army's S&T vision, strategy, principles, and priorities; and reviews and approves ATDs and STOs.

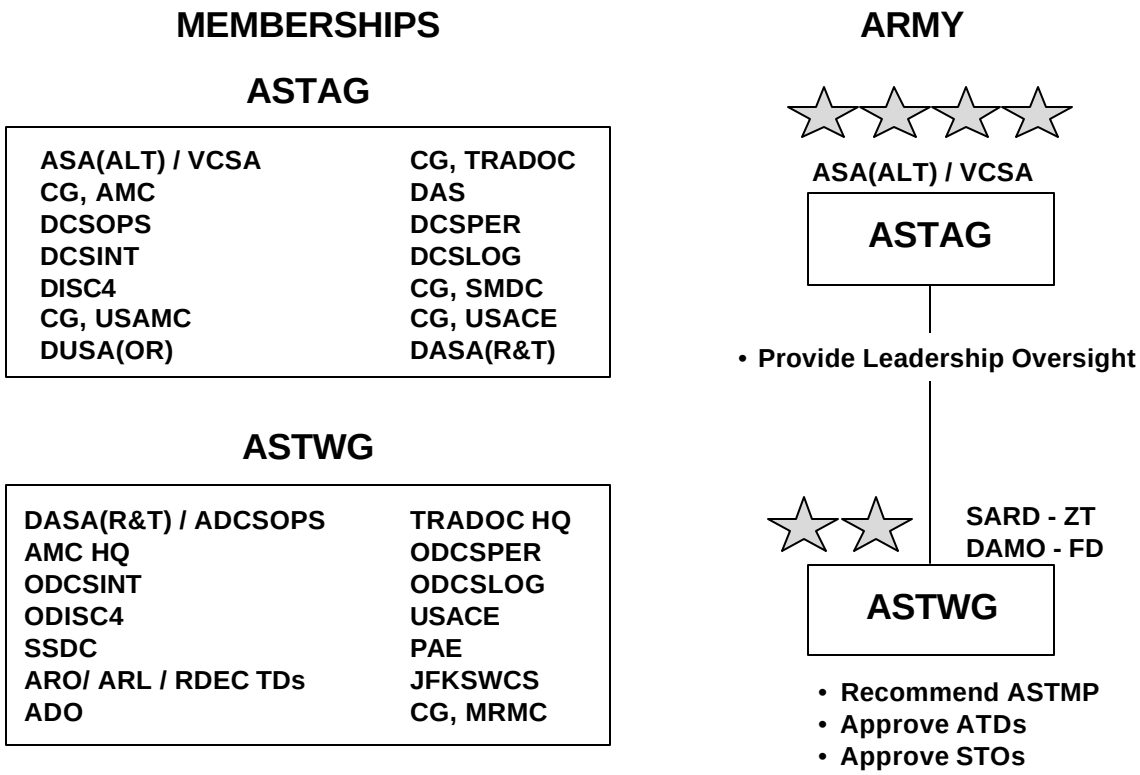


Figure 11-6

Technology Transition Strategy.

The basic strategy of the S&T program is to transition mature technologies into operational systems that satisfy approved warfighting materiel requirements. Key to this strategy are demonstrations. TDs, ATDs, ACTDs exploit technologies derived from applied research (6.2), which in turn build on new knowledge derived from basic research (6.1) programs. These TDs, ATDs, and ACTDs provide the basis for new systems, system upgrades, or advance concepts which are further out in time. The critical challenge is to tie these programs together in an efficient and effective way. TDs are not new. What is new is the scope and depth of the technology demonstrations, the increased importance of their role in the acquisition process, and the increased emphasis on user involvement to permit an early and meaningful evaluation of overall military capability. The following sections provide an explanation of TDs, ATDs, ACTDs, as well as systems/system upgrades.

Technology Demonstrations (TDs). The primary focus of TDs is to demonstrate the feasibility and practicality of a technology for solving specific military requirements. They are incorporated during the various stages of the 6.2 and 6.3 development process and encourage technical competition. They are most often conducted in a non-operational (lab or field) environment. These demonstrations provide information that reduces uncertainties and subsequent engineering cost, while simultaneously providing valuable development and requirements data.

Advanced Technology Demonstrations (ATDs). Within each of the 10 DOD Technology Area Plans (DTAPs), previously discussed, specific ATDs are being structured to meet established goals. Detailed roadmaps to guide their progress are being developed, as well as exit criteria to define their goals. ATDs are risk reducing, integrated, "proof of principle" demonstrations designed to assist near-term system developments in satisfying specific operational capability needs. The ATD approach has been promoted by the Defense Science Board (DSB) and the Army Science Board (ASB) as a means of accelerating the introduction of new technologies into operational systems. They are principally funded with advanced technology development (6.3) funds. ATDs facilitate the integration of proposed technologies into full system program definition and risk reduction (6.4) or engineering and manufacturing development (6.5) prototype systems. As such, they provide the link between the technology developer, PM, PEO, and the Army user. The criteria for establishing an ATD are:

- execution at the system or major subsystem level in an operational rather than a laboratory environment;
- potential for new or enhanced military operational capability or cost effectiveness;
- duration of three to five years;
- transition plan in place for known and/or potential applications;
- active participation by TRADOC battle Lab and user proponents;
- participation by the MATDEV (PM);
- use of simulation to assess doctrine/tactical payoffs; and
- exit criteria established with user interaction/concurrence.

As of this update, the Army has 20 ATDs which have been approved by the ASTWG. More detailed information including exit criteria for each ATD can be found in the ASTMP previously discussed.

Advanced Concept Technology Demonstrations (ACTDs). The newest initiative in the DOD acquisition strategy is the ACTD. The DOD ACTD initiative, grew from the 1986 Packard Commission recommendation for rapid prototyping. ACTDs are joint Service in nature, featuring CINC sponsorship and provide as much as two years of leave-behind (residual) capability in the field. ACTDs apply advanced technologies to joint warfighting requirements to provide an advanced capability in limited time frames. The ACTD is an integrated effort to assemble and demonstrate a significant new military capability, based upon maturing advanced technology(s), in a real-time operation at a scale adequate to clearly establish operational utility and system integrity. ACTDs are jointly sponsored and implemented by the operational user, and MATDEV communities, with approval and oversight guidance from the Deputy Under Secretary of Defense for Advanced Technology (DUSD[AT]).

The ACTD concept is a cornerstone in the new acquisition strategy that relies on prototyping and demonstration programs to maintain the U.S. military technological edge in the face of declining procurement budgets. ACTDs are a maturer phase of the ATDs. They are two- to four-year efforts in which new weapons and technologies are developed, prototyped, and then tested by the soldiers in the field for up to two years before being procured.

ACTDs are not new programs, but tend to be a combination of previously identified

ATDs, TDs, or concepts already begun. They include high level management and oversight to transform disparate technology development efforts conducted by the various military services into prototype systems that can be tested and eventually fielded. The ACTD becomes the last step in determining whether the military needs and can afford the new technology.

Systems and System Upgrades. The development of the next set of materiel systems requires prior demonstration of the feasibility of employing new technologies. "New-start" systems are those next in line after the ones currently fielded or in production. For these systems, most technical barriers to the new capability have been overcome. Generally, these systems can enter engineering and manufacturing development (acquisition system management process phase II) relatively quickly as a result of the successful demonstration of enabling technologies. Based on current funding guidance, the number of "new-start" systems is in a sharp decline.

In the absence of "new-start" systems, the Army is pursuing incremental improvements to existing systems to maintain its technological edge, and capabilities. As defined in the *ASTMP*, these improvements are designated as systems upgrades. System upgrades are brought about through technology insertion programs (discussed in detail later), service life extension programs (SLEPs), preplanned product improvements (P3I), and block improvement programs. These upgrades are based primarily on the success of funded 6.3 ATDs/TDs. The 6.3 ATDs/TDs either are the basis for the system upgrade or have a high probability of forming the basis for the system upgrade.

Warfighting Experiments.

Warfighting experiments are the heart of DOD/Army's warfighting requirements determination process. Progressive and iterative mixes of high fidelity constructive, virtual and live simulations using real soldiers and units in relevant, tactically competitive scenarios provide Army leaders with FOC insights. Warfighting experiments are conducted to gain understanding about some aspect of future warfighting. Capability insights from warfighting experiments are "way points" used by the Army to plot its future course to Force XXI and Army After Next (AAN). There are three main categories of warfighting experiments -- concept experiments, advanced warfighting experiments (AWEs), and joint warfighting experiments (JWEs).

Concept Experiments. The overwhelming majority is concept experiments pertaining to TRADOC individual operations or branches. Most concept experiments are conducted as part of the TRADOC Concept Experimentation Program (CEP). CEP is a separately funded TRADOC initiative that provides quick reaction assessments of the military utility/potential for new or revised doctrine, training, leader development, organization, materiel, or soldier (DTLOMS) concepts. They are a means to "model-experiment-model" possible requirements and are the building blocks in the "progressive and interactive mix" of simulations. Additionally, they are usually small enough to support the detailed planning and data collection required by the test and evaluation communities. A concept proponent conducts the experiment or requests a battle lab to sponsor it. They either resource it in in-house or request resources from HQ, TRADOC.

Advanced Warfighting Experiments (AWEs). AWEs are the Army's capstone Force XXI/AAN experimentation events focused on a major increase in warfighting capability across multiple branches and the full DTLOMS spectrum. Any concept proponent recommends the AWE, the TRADOC Commander sponsors it, and the CSA approves and resources it.

Today, most AWEs employ live simulations--soldiers and units in field environments. However, live simulations are very expensive, and if they involve new materiel, may occur late in the materiel development cycle. Future warfighting experiments will use a comprehensive suite of reconfigurable simulators and simulations in addition to live simulations. Distributed interactive simulations (DIS) connected by the Defense Simulations Internet (DSI) will create a synthetic theater of war (STOW) that enables Army leaders to quickly model, evaluate and change different requirements from any of the DTLOMS domains. Thus, future warfighting experiments will leverage relatively low-cost models to explore requirements across the DTLOMS spectrum, reserving expensive field exercises for the final defining event in the requirements determination process.

Joint Warfighting Experiments (JWEs). JWEs are a mechanism for experimenting with systems or systems involving advanced technologies prior to commitment to acquisition programs. They are conducted as part of joint warfighting exercises (JWE). A JWE is a snapshot in time when prototypes from ATDs, ACTDs, development programs and technology base efforts are integrated to permit the warfighter to evaluate their combined potential and gain insight into future advanced joint warfighting concepts. JWEs are DOD-wide efforts to support the horizontal integration and synchronization of advanced technologies from ACTDs, ATDs, and advanced distributed simulation products for experimentation in joint warfighting exercises, such as the 1995 Roving Sands theater missile defense joint warfighting experiment sponsored by the Commander in Chief, U.S. Central Command.

Warfighting experiments provide an unsurpassed means to understand future warfighting requirements. Planned and executed with the entire combined arms team and appropriate other Service elements, warfighting experiments open the "windows to the future". Understanding the cost and benefits of change across the force and in all domains allows us to "maintain the edge" and conserve resources at the same time.

MATERIEL SYSTEMS ACQUISITION MANAGEMENT PROCESS

The materiel acquisition (RDA) process is initiated as a result of output--approved warfighting materiel requirements--from the requirements determination process efforts of the CBTDEV.

Identified materiel requirements are first assessed to determine if they can be satisfied by nonmateriel solutions. Nonmateriel solutions include changes in doctrine, training, leader development, organization, and soldiers (DTLOS).

Only if these nonmateriel solutions will not satisfactorily overcome the deficiency is a new development materiel program initiated. A hierarchy of potential materiel alternatives (strategies) must be considered before committing to a new start acquisition program. In order of preference, the materiel alternatives are:

- use or modification of an existing U.S. military system;
- use or modification of an existing commercially-developed or allied system that fosters a nondevelopmental acquisition strategy;
- a cooperative research and development program with one or more allied nations;
- a new joint-Service development program; and
- a new Service-unique development program.

In the broad sense, the acquisition process consists of a series of sequential management decisions made in DOD or the Army as the development of a materiel system progresses from a stated materiel requirement to a fielded system. Product improvements (PIs) to existing systems or acquisition of nondevelopmental items (NDI) usually occurs through acquisition streamlining (discussed later in the chapter). The framework that is used in the materiel acquisition process is shown in Figure 11-7.

A key aspect of the materiel acquisition process is that it is divided into four distinct phases: Concept Exploration; Program Definition and Risk Reduction; Engineering and Manufacturing Development; and Production, Fielding, Deployment/Operational Support. Entry into each of these phases is controlled by four decision points, called milestones (MS).

Determining and Documenting Materiel Requirements.

All acquisition programs are based on identified future operational materiel needs. Determination of these needs is a result of continuing assessments of current and projected capabilities in the context of military threat and national military policy. A mission need may address: (1) a new operational capability, (2) improvement of an existing capability, or (3) a desire to exploit promising technologies. Mission needs can be identified by Unified Commands, the Military Departments, OSD, or the Joint Staff. In theory, mission need identification should first exhaust all nonmateriel solutions such as, doctrine, training, or organizational changes. When a need is identified that could potentially result in the establishment of a new acquisition program, a MNS is prepared that is a nonsystem-specific statement of operational capability. The MNS can be prepared by any DOD Component which has identified a specific mission area materiel requirement or need.

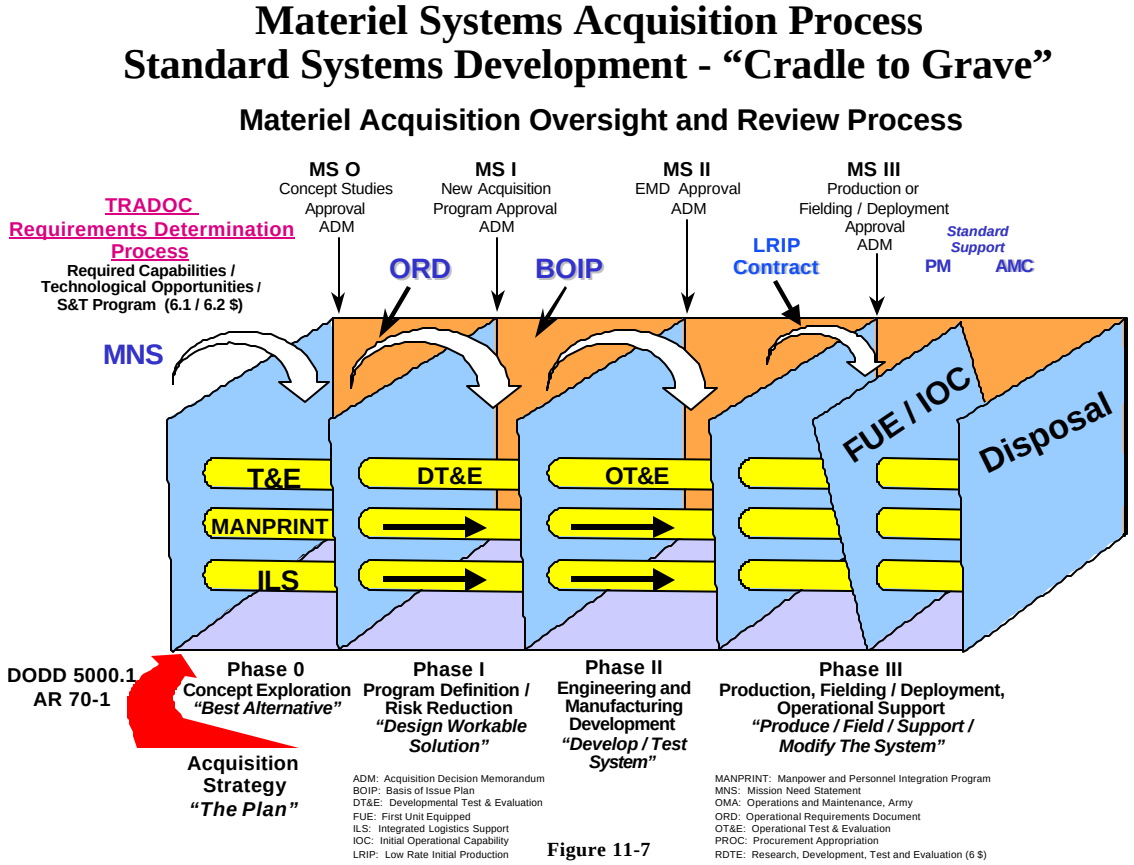


Figure 11-7

Acquisition Categories.

When the materiel requirement and manner of acquisition have been identified, the acquisition is designated as acquisition category (ACAT) I-IV. This category determines the level of review, and who will make the milestone decisions. Dollar criteria and visibility of the potential program determine the ACAT. There are four acquisition categories, as shown in Figure 11-4.

Acquisition Strategies and Program Plans.

An Acquisition Strategy (AS) is the framework for planning, directing, and managing an acquisition program to satisfy an approved materiel requirement. Acquisition strategies and their supporting program plans are tailored to accomplish established program objectives and to control risk. They must also provide the information essential for milestone decisions. In this regard, acquisition strategies are event-driven and explicitly link major contractual commitments and milestone decisions to demonstrated accomplishments in development and testing.

Program plans provide for a systems engineering approach to the simultaneous design of the product and its associated manufacturing, test, and support processes. This concurrent engineering approach is essential to achieving a careful balance among system design requirements (for example, operational performance, producibility, reliability, maintainability, logistics and human factors engineering, safety, survivability, interoperability, and standardization). Maximum practicable use is made of commercial and other nondevelopmental items. The Army's first

preference is to use performance specifications, the next is to use non-government standards (NGS), and as a last resort military specifications and standards (MILSPECs/STDs) may be used. Use of MILSPECs/STDs requires a waiver. Additionally, changes to *DOD Regulation 5000.2R* resulting from the Federal Acquisition Streamlining Act (FASTA) of 1994 state the AS should be tailored to the extent feasible to employ commercial practices when purchasing commercial products or other nondevelopmental items.

Cost as an Independent Variable (CAIV). CAIV is the DOD cost reduction methodology utilized throughout the entire life-cycle of a programs acquisition process to ensure operational capability of the total force is maximized for the given modernization investment. In other words, cost is treated as an independent variable along with others used to define a system. Cost performance analysis is conducted on a continuous basis throughout the life-cycle. CAIV directly impacts the preparation of a program's requirements documents (MNSs, CRDs and ORDs), as well as acquisition documents (AS and APB).

NOTE: CAIV does not preclude consideration and evaluation of a new high potential, leap-ahead but expensive DTLOMS technology.

Environmental Considerations.

Environmental impact is always considered in Defense acquisitions. The National Environmental Policy Act (NEPA) of 1969 mandates documentation of the environmental effects of proposed federal actions. The Act requires initiation of NEPA compliance before development begins; environmental analysis for each milestone decision; accounting for all direct, indirect, and cumulative environmental impacts before production starts, and analysis of life-cycle environmental costs. The environmental documentation process can be lengthy and costly. Early consideration of environmental impacts and NEPA requirements will protect not only the environment, but cost and schedule as well.

Risk Assessment and Management.

Program risks and risk management plans are explicitly assessed at each milestone decision point prior to granting approval to proceed into the next acquisition phase. Risks must be well understood, and risk management approaches developed, before MDAs can authorize a program to proceed into the next phase of the acquisition process. To assess and manage risk, MATDEVs use a variety of techniques. They include TDs, prototyping, and T&E. Risk management encompasses identification, mitigation, and continuous tracking and control procedures that feed back through the program assessment process to decision authorities. PMs, and other MATDEVs develop a contracting approach appropriate to the type system being developed and acquired.

ACQUISITION PHASES AND MILESTONES

All acquisition programs accomplish certain core activities described *in DODD 5000.1 and DOD Reg 5000.2R.* How these activities are conducted is tailored to minimize the time it takes to satisfy an identified need consistent with common sense and sound business practice. Tailoring gives full consideration to applicable statutes. The

number of phases and milestones are tailored to meet the specific needs of the individual PMs, based on objective assessments of a program's category status, risks, and adequacy of proposed risk management plans, and the urgency of the user's need. Tailored acquisition strategies may vary in which core activities are to be conducted, the formality of reviews and documentation, and the need for other supporting activities.

Milestone 0 – Approval to Conduct Concept Studies.

Milestone 0 marks the initial formal interface between the requirements determination and the acquisition management systems. At this decision point it is decided what action will be taken on a MNS. If the MNS is validated, studies of a minimum set of materiel alternative concepts are authorized. Approval for studies, however, does not establish a new acquisition program. Instead, it merely reflects approval to proceed with studies of alternative concepts that could satisfy the identified mission need. These studies may be done by in-house or contract efforts, or by a combination of both. At MS 0 the MDA normally considers the following:

- a validated MNS,
- satisfying the need with a nonmateriel solution,
- whether the need is sufficiently important to warrant funding of study efforts,
- Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) support requirement (see *DOD 5000.2R, Part 2.2.1*), and
- an Analysis of Alternatives (AoA) for ACAT IA programs.

The MS 0 Acquisition Decision Memorandum (ADM) approves entry into Phase 0 and should: define the minimum set of alternative concepts to be examined, identify a lead organization for study efforts, and identify funding/source for study efforts.

Phase 0 – Concept Exploration (CE).

The purpose of this phase is to determine if a new system is required and if so, to document system characteristics and performance parameters, including cost. Competitive, parallel, short term studies by the Government and/or industry will normally be used during this phase. Key outputs during this phase are development and approval of the initial ORD with proposed KPPs, the AS, and the development of the concept APB, as well as, advise the MS I MDR principals on whether a new program is warranted. Key to this effort is the synchronization and linkage of the requirements trade-off/operational analyses, concept studies, cost-schedule-performance trade-offs and AoA.

- An CBTDEV-led ICT manages an approved warfighting materiel requirement during the concept exploration phase. The ICT conducts analyses, ensures inclusion of all alternatives in the analyses, monitors experimentation, or undertakes other tasks that may require the concentration of special expertise for a short duration. An ICT is normally chartered and under the supervision of TRADOC. The director of the ICT manages the approved materiel requirement prior to MS I or designation of the MATDEV PM.
- Concept studies. The MATDEV, in coordination with the ICT, conducts

concept studies to examine the feasibility of different technology solutions and to refine technology concepts. These studies develop rough performance estimates to permit first-cut, rough trade-offs among system performance, operational capability, requirements and costs. These studies identify potential system concept alternatives and result in initial broad objectives for cost, schedule, performance, software, requirements, and opportunities for trade-offs.

- Requirements trade-offs/operational analysis. Requirements trade-offs and operational analysis are conducted by the ICT to support development of the initial ORD and decisions regarding which materiel alternative (for example, modified current system, program systems, NDI [conceptual]) should be pursued to satisfy the ORD. The initial ORD should include system performance thresholds and objectives that are consistent with initial broad statements of operational capability. The MATDEV conducts trade-off analyses to support the ICT, to support the development of the concept APB, and provides the basis for initial cost targets provided to the MDA and Cost Performance Integrated Product Team (CPIPT). These MATDEV analyses explore the relationships between the cost and performance of anticipated system characteristics.

Key activities in this phase normally include the following:

- Development of the program AS. The AS is a key document that describes alternatives to be pursued later in the program life-cycle, and portrays overall plans for program development.
- Development of the ORD and KPPs.
- Development and validation of a Program Office Estimate (POE) and Component Cost Analysis (CCA). The ICT develops the POE in Phase 0. CEAC develops the independent CCA for major systems. The POE and CCA must be developed in parallel with the development activity to preclude lengthening the acquisition cycle.
- Convene the Army Cost Review Board (CRB) to recommend the Army Cost Position (ACP) to the ASA(FM&C) for approval and presentation to Army leadership, assisting their role in making programming and budgeting decisions at MDRs.
- Completion of an Analysis of Alternatives (AoA). The AoA provides information to the decision authority at the MS I review to assist in determining whether any of proposed alternatives to an existing system offer sufficient military and/or economic benefit to be worth the cost.
- For each system alternative, development of employment concept, training concept, logistics support concept, contracting concept, and test and evaluation concept.
- Development of a Standardization and Interoperability (S&I) plan.
- Development of a System MANPRINT Management Plan (SMMP) to ensure an effective MANPRINT program is implemented.
- Charter the Test and Evaluation Integrated Product Team (TE IPT).
- Initial development of the Test and Evaluation Master Plan (TEMP).

Milestone I – Approval to Begin a New Acquisition Program.

MS I marks the first direct interaction between the planning, programming, budgeting, and acquisition management systems. The primary documents produced during the planning phase of the PPBS form the basis for such assessments. These documents are the Defense Planning Guidance (DPG) and the Services long range modernization and investment plans. Cost as independent variable (CAIV) life-cycle based objectives are normally established at this MS and refined and updated at subsequent MSs. The purpose of the MS I decision is to determine if the results of phase 0 warrant establishing a new acquisition program and to approve entry into Phase I, Program Definition and Risk Reduction. At MS I, the MDA normally considers the following:

- threat assessment*
- acquisition strategy (AS)
- CAIV life cycle-based objectives
- phase 0 exit criteria status and Phase I exit criteria plans
- concept APB
- AoA and studies supporting need for new program
- environmental consequences*
- adequacy of resources (manpower and funding)
- hierarchy of materiel alternatives*
- affordability assessment
- updated Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) support requirement

- *Normally not applicable to ACAT IA programs*

At MS I, the MDA's ADM approves the program AS, CAIV objectives, the concept APB, and phase I exit criteria (program-specific results required in the next phase).

Phase I – Program Definition and Risk Reduction (PDRR).

During this phase program risk is identified and reduced as much as possible before making the crucial decision on selecting a feasible workable solution that best meets program objectives and whether to enter Phase II - Engineering and Manufacturing Development with the intent eventually to field/deploy. This phase focuses on defining critical design characteristics (to include manpower, personnel, and training constraints), addressing manufacturing technologic deficiencies, and assessing production feasibility. Analysis, simulation models, or prototypes are used to optimize design and resolve problems. Mission effectiveness and life-cycle cost depend upon integrated system/subsystem relationship and trade-offs; therefore no subsystems are designed or prototyped independently of the prime system.

Consistent with evolutionary requirements definition, the PM works with the CBTDEV or CBTDEV's representative to: establish proposed performance objectives, identify production rate requirements for peacetime, contingency support, and reconstitution objectives, and develop proposed cost-schedule-performance trade-offs for decision at MS II.

Detailed work on the ILS begins during this phase, so that these activities do not pace fielding. DT&E and Early User Test and Experimentation (EUTE) generally are conducted in this phase to support a milestone

decision. Integrated T&E is conducted, as appropriate, with training simulators, test equipment tools, and other subsystems. Detailed work is continued in MANPRINT.

The POE and the AoA are updated by the PM, and CEAC updates the CCA. The CRB convenes to recommend the ACP to the ASA(FM&C) for approval and presentation to Army leadership at MS II. A formal risk analysis is also completed. The ORD is updated supporting work to be undertaken in phase II. The updated ADM records the decisions and provides an audit trail for future use.

Milestone II - Approval to Enter Engineering and Manufacturing Development.

The purpose of the MS II decision point is to determine if the results of phase I warrant continuation of the program and to approve entry into Phase II - Engineering and Manufacturing Development. The MDA rigorously assesses affordability, program risks, and risk management at this decision MS. This is critical because of the significant resource commitment that is associated with this decision. Establishing the development APB requires effective interaction among the requirements determination, acquisition management, and PPBS/PPBES systems. The low-rate initial production (LRIP) strategy is normally considered at this MS. At MS II, the MDA normally considers the following:

- acquisition strategy (AS)
- CAIV progress
- development APB
- phase I exit criteria status and phase II exit criteria plans
- LRIP quantities*
- validated threat assessment*
- prototyping/demonstration results
- potential environmental consequences
- adequacy of resources (manpower and funding)
- independent cost and manpower estimates
- updated Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) support requirement

* Normally not applicable to ACAT IA programs; a favorable LRIP decision (normally a separate program review) authorizes the PM to commence LRIP only. The PM is only authorized to commence full-scale production with further approval of the MDA.

At this decision point, the MDA's ADM approves the AS, CAIV objectives, the development APB, phase II exit criteria, and LRIP quantities.

Low-Rate Initial Production (LRIP). Development approval typically involves a consideration of LRIP quantities, which must be identified by the MDA for all ACAT I programs. If early production indicates higher costs than estimated, the Overarching Integrated Product Team (OIPT) may need to consider CAIV issues regarding problematic cost drivers. The OSD Director of Operational Test and Evaluation (DOT&E) determines the quantity of LRIP systems required for operational testing. For ACAT I programs, authority to proceed with LRIP normally requires a separate program review and MDA approval at a point specified in the MS II decision. For ACAT ID programs there is normally no more than one decision (i.e. either LRIP or full production) at the DAB level.

The MDA should consider the following in making the LRIP quantity

determination: the fabrication complexity of the system, the relatively small number to be procured and high unit cost, the length of the production period, the need to preserve the industrial base for the system, and the AS that is most advantageous to the Government. For programs past MS II, but not past LRIP, the determination of LRIP quantity should be made as soon as reasonably possible. LRIP quantities for ACAT II, III, and IV programs are determined using the requirements for ACAT I programs as guidelines. At the LRIP decision, the MDA normally considers the following:

- acquisition strategy (AS)*
- APB*
- phase II exit criteria*
- threat assessment*
- test results*
- initial production experience*
- environmental consequences*
- CAIV progress
- adequacy of resources (manpower and funding)*
- updated Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) support requirement
- independent cost and manpower estimates

* Normally not applicable to ACAT IA programs

Phase II - Engineering and Manufacturing Development (EMD).

The purpose of Engineering and Manufacturing Development is to design, fabricate, test, and evaluate a complete system. This includes the principal items necessary for its production, operation, and support. RAM design, testing, and evaluation of components should be integrated into the earliest part of this phase. When making design trade-offs, it is not standard practice to design either to the performance floor or to the cost ceiling. Trade-offs are done in a manner, which gives optimal overall system cost-effectiveness. Simplicity is emphasized as opposed to sophistication. High priority is placed on ensuring adequate quantities of equipment can be afforded. The PM has the authority to make trade-offs within the bounds of the ORD, the last ADM, and any special conditions imposed by the MDA. Producibility engineering and planning are completed to include development and validation of a complete Technical Data Package (TDP), and specification and "prove out" of the required production resources. The ILS is fully developed and it is tested in technical and user tests via a System Support Package (SSP) which includes the logistics support elements including training materiel, training ammunition, training devices, and automated test equipment. The MANPRINT program is now geared to validate what are the manpower, personnel, and training (MPT) requirements, what MPT are available, and what are the appropriate trade-offs.

Production Qualification Test and Evaluation (PQT&E) is conducted by policy, and Initial Operational Test and Evaluation (IOT&E) is conducted by law and must be conducted before a production decision. Again, the POE is updated by the PM, while CEAC updates the CCA. The CRB again convenes to recommend an updated ACP to the ASA(FM&C) for approval and presentation to Army leadership at MS III. The AoA will be updated, if required, using updated threat data, test data, and more detailed cost estimates. The TEMP and S&I plan are updated as necessary.

The ADM is updated to reflect decisions that change the program baseline. A production readiness review is conducted. The ORD is updated as necessary. Coordination continues, as appropriate, with TSG, COE, and Office of the General Counsel (OGC).

Milestone III - Production or Fielding/Deployment Approval.

The purpose of this MS III decision point is to authorize program production and fielding. A favorable decision at this MS represents a commitment to build, deploy, and support the system. The MDA should confirm the affordability of the proposed system, determine that the materiel item is approved for Service use as part of the production approval process, ensure that the design is stable and producible, and that production processes have been proofed. At this MS, the MDA's ADM approves the AS, a realistic production APB, and phase III exit criteria, if appropriate.

The decision to proceed beyond LRIP cannot be finalized for ACAT I programs until the DOT&E beyond LRIP and LFT&E reports are received by Congress. At MS III, the MDA normally considers the following:

- acquisition strategy (AS)
- production APB
- phase II exit criteria
- threat assessment*
- test results
- initial production experience*
- environmental consequences*
- CAIV progress
- adequacy of resources (manpower and funding)
- independent cost and manpower estimates
- updated Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) support requirement

* Normally not applicable to ACAT IA programs

Phase III - Production, Fielding / Deployment, and Operational Support (PF/DOS).

System performance and quality is normally monitored by follow-on operational test and evaluation (FOT&E) during this phase. Program budget execution status is periodically reviewed by the planning, programming, and budgeting and acquisition management systems. The results of field experience to include operational readiness rates are continuously monitored, particularly during the early stages of this phase. The objectives are to assess the ability of the system to perform as intended, identify and incorporate into production lots minor engineering change proposals (ECPs) to meet required capabilities, and identify the need for major upgrades or modifications. Support plans should be implemented to ensure support resources are acquired and deployed with the system.

Successful completion of DT&E, OT&E, and MS III approval permit production at rates based on manufacturing efficiency, operational demand, and resource availability. Initial production items are used for production test and follow-on evaluation as necessary. Production will not, however, be suppressed to await completion of FOT&E. Deployment does not await conclusion of this evaluation. A validated Technical Data Package (TDP) is essential for use in competitive procurement. Therefore, initial production normally will be conducted by the MATDEV. The government

ordinarily obtains production rights. Where economies can be achieved, second production sources are established at the earliest possible date, after a proven TDP is available.

Additional Considerations.

The above discussion examined the activities performed in each phase of the nominal life-cycle of an acquisition system according to the current *DODD 5000.1, DOD Reg 5000.2R, and AR 70-1*. This is not to imply that all system developments must follow this exact sequencing of life-cycle phases and activities. On the contrary, *DOD Regulation 5000.2R* specifically authorizes and encourages a PEO/PM to devise program structures and acquisition strategies to fit the particulars of a program; an approach called "tailoring." Additionally, where justified (for example, a nondevelopmental item (NDI) acquisition), milestones and phases may be omitted or combined, a procedure called "streamlining." Other aspects of acquisition planning and strategy; for example, involving preplanned product improvement (P3I) and technology insertion can also be accommodated under the broad guidance and direction contained in *DODD 5000.1 and DOD Reg 5000.2*. What remains constant is the task to develop and deliver combat-capable, cost-effective, and supportable systems to our Armed Forces.

ACQUISITION DOCUMENTATION

Acquisition management documentation is designed to support the management process as the life-cycle development of a materiel system progresses. In addition, the decisions of the MDA are articulated in the Acquisition Decision Memorandum (ADM).

Materiel Requirements Documents (MRDs).

MRDs establish the need for a materiel acquisition program, how the materiel will be employed, and what the materiel must be capable of doing. As the acquisition program progresses, statements of required performance and design specifications become more and more specific. The MNS is the document that initiates the acquisition system management process. The ORD is the document that defines the system capabilities needed to satisfy an approved MNS, and is developed during Phase 0, Concept Exploration.

Mission Need Statement (MNS). The MNS is a nonsystem-specific statement of operational capability need. The Unified Commands, the Military Departments, OSD, or the Joint Staff may identify Mission needs. The CBTDEV is the proponent for the development of the MNS, but other participants in the process include the MATDEV, manpower and personnel planners, the TNGDEV, and the logistician. In preparing the MNS, mission needs are identified as a direct result of continuing assessments of current and projected capabilities in the context of changing military threats and national defense policy. The MNS reflects an evaluation that a nonmateriel solution is not a viable consideration. Potential materiel alternatives such as commercial systems, or known systems or programs addressing similar needs that are deployed or are in development or in production by any of the Services or allied nations are identified in the document. The MNS describes key boundary conditions related to infrastructure support that may impact on satisfying the need. These include logistics support; transportation; mapping, charting, and geodesy support; manpower, personnel, and

training constraints; command control, communications, and intelligence interfaces; security; and standardization or interoperability within the North Atlantic Treaty Organization (NATO) or with other allies or DOD components. The document also contains a description of operational environments (including conventional; initial nuclear weapon effects; nuclear, biological, and chemical contamination; electronic; and natural) in which the developing system is expected to operate. The MNS is a one-term document, which is not revised. Potential ACAT I / IA MNSs format and content is in *CJCSI 3170.01*, *Enclosure A*.

MNSs that could potentially result in the initiation of new ACAT I programs are forwarded through DA, to the JROC for review and confirmation that the mission cannot be satisfied by a nonmateriel solution. The JROC determines the validity of the identified need, assigns a joint priority as appropriate, and forwards the MNS to the USD(A&T) for approval. For approved MNSs, a subordinate OIPT of the DAB reviews them for materiel alternatives and recommended study efforts prior to the DAB convening for a MS 0, Concept Studies Approval, review.

Operational Requirements Document (ORD). Each concept proposed at MS I is described in an initial ORD in terms of minimum acceptable requirements (thresholds) that defines the system capabilities needed to satisfy a MNS. When appropriate, objectives for each parameter representing a measurable, beneficial increment in operational capability or operations and support are established. Objectives should not be stated if they cannot be supported with operational rationale.

ACAT ID and IAM ORDs are approved by the JROC unless previously delegated. All other Army-generated ORDs are approved by the CG, TRADOC. ORDs are updated and expanded for MS II to include thresholds and objectives for more detailed and refined performance capabilities and characteristics based on the results of trade-off studies and testing conducted during phase I. After MS II ORDs are only modified when there is a change in the mission need or the CBTDEV/TNGDEV determines a need to significantly change the performance envelope represented by the ORD minimum acceptable value (threshold) requirements. The MATDEV uses the ORD to develop system performance requirements for contract specifications during each acquisition phase.

ORDs specify at least two levels of performance characteristics, minimum acceptable value (threshold) requirement and objective requirement *(DOD Regulation 5000.2R and CJCSI 3170.01)*. The objective requirement for parameters is provided only when the CBTDEV/TNGDEV desire a relevant and operationally significant capability above the threshold requirement. ORDs identify recommended KPPs to appropriately focus the acquisition effort and decision making. ORDs are adjusted only after the CBTDEV or TNGDEV, as appropriate, and the MATDEV agree that such changes are necessary to authorize development of the system or TADSS to the required capability. ORD format and content is in *DOD Reg 5000.2R.*

Capstone Requirements Documents (CRDs). CRDs can be a combination of two or more MNS/ORDs/programs, which, when considered together form a system-of-systems. The CRD identifies systems requirements to define a mission area and serves as a guide for ORD development. The CRD is the bridge between the MNS and program ORDs. It is appropriate when a mission area requires more than one ORD and provides guidance to support ORD development. The CRD should

be developed after the MNS is validated and prior to MS 0. The CRD may identify common requirements that must be included in all program ORDs. Approval authorities may add or delete KPPs to ensure program ORDs are consistent with the CRD. The CRD is not an ORD and is not intended to be testable. It is a living document that reflects changes in threat or technologies.

Operational Need Statement (ONS). Operational field commanders use an ONS to document the urgent need for a materiel solution to correct a deficiency or to improve a capability that impacts upon mission accomplishment. The ONS provides an opportunity to the field commander, outside of the acquisition and CBTDEV/TNGDEV communities, to initiate the requirements determination process. The ONS is not a materiel requirements document. The CBTDEV, TNGDEV or MATDEV communities do not initiate or develop an ONS.

Response to an ONS varies depending on the criticality of the need for the proposed item. Response can range from a HQDA directed requirement and fielding of a materiel system to the forwarding of the action to TRADOC for review and routine action. HQDA may decline to favorably consider an ONS for a variety of reasons, including conflicting needs, higher priorities for funding, existence of a similar system, or nonconcurrence of the criticality of the need. The response to an ONS is based on an ARSTAF validation supported by TRADOC, AMC, and MATDEV reviews. ODCSOPS determines validity of the need, availability of technology, and source of resources to fill this requirement. If the need is determined to be urgent, critical, and can be resourced (at least for the present situation) a directed requirement may result. If no solution is available or if the need is not urgent or critical the ONS will be turned over to CBTDEVs, TNGDEVs and MATDEVs to find solution. All ONS are reviewed by the CBTDEVs/TNGDEVs to determine applicability to future requirements or continuing need for which a standard requirement (ORD) and acquisition is needed. If validation of the ONS indicates that the concept has potential for Army-wide application and development of a new system is appropriate, TRADOC will initiate a MNS and/or ORD as appropriate. If validation indicates that there exists a specific limited but necessary critical need, HQDA may issue a directed requirement for ONS having Army-wide application; however, tailored development and standard documentation should be used in this instance.

The ONS process may shorten NDI acquisition by shortcutting the requirements determination process enroute to a buy decision; however; the ONS is more important to users because it starts the requirements determination process moving in the absence of any other impetus.

Other Service Requirements.

The CBTDEV/TNGDEV reviews other Service warfighting capability requirements documents for potential Army interest. When the Army chooses to participate in the RDA of another Service program, HQDA initiates action to validate and approve the documentation. When another Service requirement document, to include an approved production RFP, adequately describes an Army requirement, the document may be approved as the Army requirement, that is, an ORD. The Army may also acquire other Service equipment with a national stock number (NSN)

that has been identified through the MATDEV market investigation and meets an approved Army need. For joint programs, requirements documents are prepared and processed in accordance with the lead services procedures. Service peculiar requirements may be documented in the other Service's ORDs and other requirement documents.

Catalog of Approved Requirements Documents (CARDS)

CARDS is an unclassified DCSOPS publication that provides information on the status of approved requirements documents. It includes both active and inactive documents. An active document or assignment of a CARDS reference number does not automatically authorize the expenditure of funds. Each program must compete for funds in the Army prioritization and programming process. ODCSOPS assigns a CARDS reference number to each requirements document after approval and prior to publication and distribution.

Program Review Documentation and Program Plans.

The MDA is responsible for identifying the minimum amount of documentation necessary for milestone review purposes. Only those mandatory formats called for by *DOD Regulation 5000.2R* are required. All other formats are used as guidance only.

Program plans are a description of the detailed activities necessary for executing the acquisition strategy. Program plans belong to the PM and are used by the PM to manage program execution throughout the life-cycle of the program. The PM, in coordination with the PEO, determines the type and number of program plans. Program plans, excluding the TEMP, are not required in support of milestone decisions and are not required for milestone documentation or as periodic reports. Some of the typical program plans used to support the execution of a program's AS are:

System Threat Assessment Report (STAR). The STAR is the basic authoritative threat assessment that supports the development and acquisition of a particular ACAT I or II system. The STAR contains an integrated assessment of projected enemy capabilities (doctrine, tactics, hardware, organization and forces) at initial operational capability (IOC) and IOC plus 10 years, to limit, neutralize or destroy the system. It explicitly identifies critical intelligence categories (CICs) which are a series of threat capabilities that could critically impact the effectiveness and survivability of the program. The STAR is a dynamic document that is continually updated and refined as a program develops. It is approved and validated in support of ASARC/DAB reviews. This report is the primary threat reference for the ORD, the modified integrated program summary (MIPS), the AoA, and the TEMP developed in support of a MDR. The STAR is approved by DCSINT and validated by the DIA for all ACAT I programs at MS I and updated for all ACAT ID programs at MS II and MS III. It is prepared for DCSINT review and approval for ACAT II and III programs, to include highly sensitive classified programs unless specifically waived by the MDA.

Modified Integrated Program Summary (MIPS). The MIPS, with its annexes, is the primary Army decision document used to facilitate top-level acquisition milestone decisionmaking. It provides a comprehensive summary of program structure,

status, assessment, plans, and recommendations by the PM and the PEO. The primary functions of the MIPS include a summary of where the program is versus where it should be; a description of where the program is going and how it will get there; an identification of program risk areas and plans for closing risks; and a basis for establishing explicit program cost, schedule, and performance objectives. It also includes thresholds in the stand-alone APB and program-specific exit criteria for the next acquisition phase. The MIPS provides answers to the following five key MDR core issues:

1. Is the system still needed?
2. Does the system work (from the viewpoints of the user, functional staffs, and the PM)?
3. Are major risks identified and manageable?
4. Is the program affordable (is adequate programming in the POM)?
5. Has the system been subjected to CAIV analysis?

NOTE: For DOD level ACAT ID/IAM MDRs the Army MIPS is sometimes called a Single Acquisition Management Plan (SAMP).

Acquisition Strategy (AS). The AS is the framework for planning, directing, and managing a materiel acquisition program. It states the concepts and objectives that direct and control overall program execution from program initiation through post-production support. An AS is required for all Army acquisition programs. The AS documents how the acquisition program will be tailored and identifies risks and plans to reduce or eliminate risks. The AS, prepared by the MATDEV/CBTDEV team, is a living document that matures throughout the program. It provides fundamental guidance to the functional elements of the MATDEV/CBTDEV organizations. Individual functional strategies leading to the preparation of detailed program plans are required to implement the AS as depicted in Figure 11- 8.

Environmental Analysis. This is a congressionally mandated analysis of the potential environmental impacts of weapons systems. It identifies land, sea or air space requirements of the most promising alternatives and describes the potential effects on the land, sea, and air environment. It also describes the potential impacts on public health and safety by the development, test manufacturing, basing operation, and support of the proposed system. The environmental impact data is weighed against system cost, schedule, and performance in deciding how to best minimize environmental harm.

Test and Evaluation Master Plan (TEMP). The TEMP documents the overall structure and objectives of the test and evaluation program. It provides a framework within which to generate detailed test and evaluation plans and it documents schedule and resource implications associated with the test and evaluation program. The TEMP identifies the necessary developmental test and evaluation (DT&E) and operational test and evaluation (OT&E) activities. It relates program schedule, test management strategy and structure, and required resources to critical operational issues; critical technical parameters; minimum acceptable operational performance requirements; evaluation criteria; and milestone decisions points. The TEMP is developed in phase 0 to support MS I and is updated before each MS review, or whenever there is a major change to the program or a baseline breach. Detailed mandatory procedures and format for

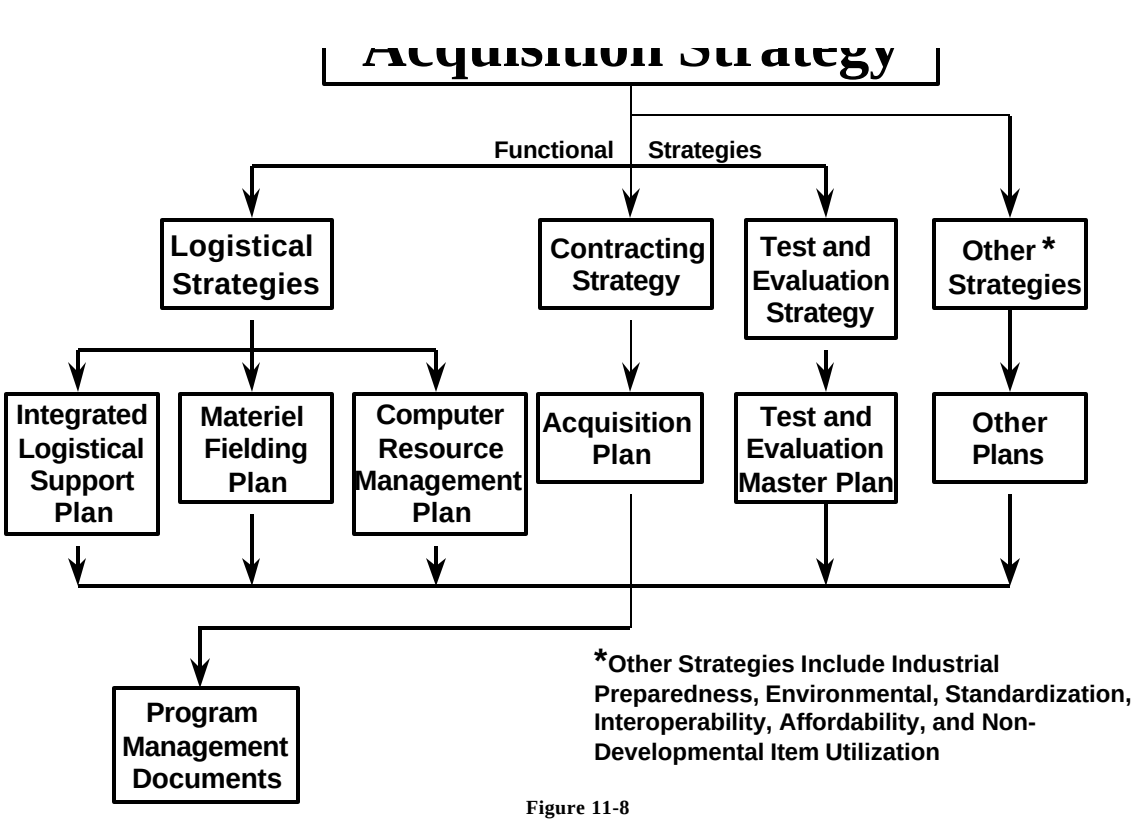


Figure 11-8

the TEMP are at *Appendix III, DOD Regulation 5000.2R.*

Project Office Estimate (POE) and Component Cost Analysis (CCA). These documents are prepared in support of MS I and all subsequent MS reviews. The cost estimates are explicitly based on the program objectives, operational requirements, and contract specifications for the system, including plans for such matters as peacetime utilization rates and the maintenance concept. The estimates identify all elements of additional cost that would be entailed by a decision to proceed with development, production, and operation of the system. They are based on a careful assessment of risks and reflect a realistic appraisal of the level of cost most likely to be realized. Two cost estimates are prepared. The POE is done by the TRADOC-led ICT in support of MS I, and the program office in support of MS II and all subsequent milestones. The other estimate is prepared by an organization that does not report through the acquisition chain. In the Army, this independent cost analysis, entitled CCA, is prepared by the Army Cost and Economic Analysis Center (CEAC) for major systems.

Analysis of Alternatives (AoA). The AoA provides information to the decision authority at the MS I review to assist in determining whether any of proposed alternatives to an existing system offer sufficient military and/or economic benefit.

The AoA focuses on broad operational capabilities, potential technology concepts, and materiel solutions that could satisfy the MNS. It examines the full range of materiel alternatives (including those identified in the MS 0 ADM). AoAs illuminate the relative advantages and disadvantages of alternatives being considered by identifying sensitivities of each alternative to possible changes in key assumptions (for example, threat) or variables (for example, selected performance capabilities). The AoA provides insights regarding KPPs for preferred alternatives and indicates how these parameters contribute to increases in operational capability. It identifies opportunities for trade-offs among performance, cost, and schedule; and determines operational effectiveness and costs

(including estimates of training and logistics impacts) for all alternatives.

If a new program is approved, the AoA may be useful for identifying alternatives that will be refined by cost performance trade-off studies during Phase I - Program Definition and Risk Reduction. It should be useful for limiting the number of alternatives to be considered during phase I. The MDA may direct updates to the AoA for subsequent decision points, if conditions warrant. For example, AoA may be useful for examining cost-performance trade-offs at MS II.

Acquisition Program Baseline (APB). The APBs consist of the concept baseline, the development baseline, and the production baseline approved at MS I, II, and III, respectively. The purpose of the baselines is to enhance program stability and to provide a critical reference point for measuring and reporting the status of program implementation. Each baseline contains objectives for key cost, schedule, and performance parameters. Key parameters must meet minimum acceptable requirements, known as thresholds, at each milestone decision point. The thresholds establish deviation limits from which a PM may not trade-off cost or performance without authorization from the MDA. The APB must track to the program ORD for performance parameters. Failure to meet the threshold requires a reevaluation of alternative concepts or design approaches. APBs and deviation reporting are required for all acquisition categories.

Manpower Estimate Report (MER). This Congressionally directed report documents the total number of personnel (military, civilian, and contractor) that are or will be needed to operate, maintain, support, and train for a ACAT ID program upon full operational deployment. The validity of the MER is dependent upon force structure, personnel management, and readiness requirements, as well as on the acquisition decision on the size of the buy.

Typical Waivers and Reports.

Live-Fire Test and Evaluation Waiver. This certifies to Congress when live-fire survivability testing of a covered major system would be unreasonably expensive and impractical.

Developmental Test and Evaluation Report. This provides the results of developmental tests and evaluation to include live-fire test results and reports.

Early Operational Assessment Report. This provides information to support Low-Rate Initial Production (LRIP) decision with exit criteria at MS II.

Operational Test and Evaluation Report. This provides the results of initial operational test and evaluation (IOT&E).

Live-Fire Test and Evaluation Report. This an independent OSD report to Congress that provides test results and assessment of tests on a covered major system or product improvement program realistic survivability testing, and a major munitions or missile program realistic lethality testing. Congress mandates this report.

Beyond Low-Rate Initial Production Report. This provides Congress with an assessment of the adequacy of initial test and evaluation and whether the test results

confirm the items are effective and suitable for combat prior to the MS III decision to proceed beyond low-rate initial production. Congress mandates this report.

Other Documentation.

Acquisition Decision Memorandum (ADM). The ADM documents the milestone decision authority's decision on the program's AS goals, thresholds, and the exit criteria for the next phase of the program. The ADM is used to document the decision for all ACAT programs.

Integrated Program Assessment (IPA). Information derived from the PM's MIPS allows the DOD OIPT to develop the IPA for program MDR. The IPA summarizes the DOD independent assessment of the PM's program. It identifies critical areas, issues, and recommendations for the MDA. For ACAT ID and IAM programs the IPA is prepared by the OIPT, approved by the OIPT leader, and submitted to the USD(A&T) or ASD(C3I), as appropriate.

ACQUISITION OVERSIGHT AND REVIEW (O&R) PROCESS

The materiel acquisition process is controlled by decisions made as the result of various acquisition programs MDRs conducted by appropriate management levels at program milestones. The reviews are the mechanism for checking program progress against approved plans and for developing revised APBs. Approval of APBs and plans in these reviews does not constitute program-funding approval; allocation of funds in the PPBS process is required.

Integrated Product and Process Development (IPPD).

As part of recent acquisition reform efforts, *DODD 5000.1* directed the DOD acquisition community to apply the concept of IPPD throughout the acquisition process to the maximum extent practicable. IPPD is a management technique that integrates all acquisition activities starting with requirements definition through production, fielding/deployment and operational support in order to optimize the design, manufacturing, business, and supportability processes. At the core of IPPD implementation are the Integrated Product Teams (IPTs). The IPT is composed of representatives from all appropriate functional disciplines working together with a team leader to build successful and balanced programs, identify and resolve issues, and make sound and timely recommendations to facilitate decisionmaking. There are two general levels of IPTs: Overarching IPTs (OIPTs) focus on strategic guidance, program assessment, and issue resolution. Working level IPTs (WIPTs) identify and resolve program issues, determine program status, and seek opportunities for acquisition reform.

Overarching Integrated Product Teams (OIPTs). In support of all ACAT ID and IAM programs, an OIPT is formed to provide assistance, oversight, and review as that program proceeds through its acquisition life-cycle. The OIPT for ACAT ID programs is led by the appropriate OSD Principal Staff Assistant (PSA). The DASD (C3I Acquisition) designates the OIPT Leader for each ACAT IAM. Program OIPTs are composed of the PM, PEO, Component Staff, Joint Staff, USD (A&T) staff, and the OSD staff principals or their representatives, involved in oversight and review of a particular ACAT ID or IAM program.

In the Army, an OIPT is established at the direction of the MDA for ACAT IC, IAC, II, IIA, III, and IV programs. The OIPT is a team of DA staff action officers and the PM/PEO/TSM responsible for integration of oversight issues to be raised to the DAB/ASARC/Information Technology (IT) OIPT/IPR review forums.

The secretary/facilitator of the OIPT for ACAT I and II programs is the OASA (ALT) or ODISC4 DASC (depending where ARSTAF system coordination resides) for that specific program. OIPT membership consist of empowered individuals appointed by ASARC members (ACAT IC, or II programs), by ITOIPT members (ACAT IAC and IIA programs) and the MDA for ACAT III and IV programs. Team membership is tailored based on the needs and level of oversight for the individual program. Typical Army OIPT responsibilities include:

- meeting together and individually with the PM/PEO throughout the program progress to raise and resolve issues early, providing recommendations for tailoring and streamlining the program;
- linking vertically with the PM's WIPTs;
- helping the PM successfully achieve a milestone decision;
- developing a memorandum documenting the issues/risks to be raised to the MDA with a recommendation to the MDA as to whether an actual ASARC, Army ITOIPT, or IPR needs to be convened, or a "paper ASARC/ITOIPT/IPR" can be held; and,
- providing an independent assessment for the MDA in preparation of the MDR.

The OIPT, at all levels, generally follow the general procedures which are described below for a typical ACAT ID and IAM program. Initially the OIPT meets to determine the extent of Working Integrated Products Team (WIPT) support needed for the potential program, who shall be members of the WIPTs, the appropriate MS for program initiation, and the minimum information needed for the program initiation review. The OIPT Leader is responsible for taking action to resolve issues when requested by any member of the OIPT or when directed by MDA. The goal is to resolve as many issues and concerns at the lowest level possible, and to expeditiously escalate issues that need resolution at a higher level, bringing only the highest level issues to the MDA for decision. The OIPT meets as necessary over the life of a program.

In support of a planned MDR, the OIPT normally convenes two weeks in advance of the anticipated review to assess information and recommendations being provided to the MDA. Additionally, at that meeting, the PM will propose the WIPT structure, documentation, and strategy for the next acquisition phase, for approval by the MDA. The OIPT Leader, in coordination with the component acquisition executive, recommends to the MDA whether the anticipated review should go forward as planned.

The OIPT leader provides an integrated program assessment (IPA), previously discussed, at major program reviews or MDRs using data gathered through the IPT process. The OIPT Leader's assessment focuses on core acquisition management issues and takes account of independent assessments that are normally prepared by OIPT members.

Working Level Integrated Product Teams (WIPTs). WIPTs are established for all

acquisition programs. The number and membership of the WIPTs are tailored to each acquisition developmental phase based on the level of oversight and the program needs. They are comprised of DA and/or Service/functional action officers and normally chaired by the PM or designee. WIPTs provide advice to the PM and help prepare program strategies and plans. Each WIPT focuses on a particular topic(s), such as test, cost/performance (CAIV), risk management (both programmatic and safety), etc.

Integrating Level Integrated Product Teams (IIPTs). When necessary, an IIPT, a type of WIPT, is initiated by the PM to coordinate all WIPT efforts and cover all topics not otherwise assigned to another WIPT.

The Defense Acquisition Board (DAB).

The function of the DAB is to review DOD ACAT ID programs to ensure that they are ready for transition from one program phase to the next. The DAB is the DOD senior level forum for advising the USD(A&T) on critical decisions concerning ACAT ID programs. The DAB is composed of DOD senior acquisition officials. The board is chaired by the USD(A&T). The Vice Chairman of the Joint Chiefs of Staff (VCJCS) serves as the vice chairman. Other principal members include the Principal Deputy USD (A&T); the Under Secretary of Defense (Comptroller); the Assistant Secretary of Defense (Strategy and Requirements); the Director of Operational Test and Evaluation (DOT&E); the Director of Program Analysis and Evaluation (PA&E); Acquisition Executives (SAEs) of the Army, Navy, Air Force; the cognizant Overarching Integrated Product Team (OIPT) Leader; the cognizant PEOs and PMs; and the DAB Secretary.

Approximately one week prior to the DAB review, a DAB Readiness Meeting (DRM) meets to pre-brief the USD (A&T), VCJCS, and other DAB participants, to include cognizant PEO(s) and PM(s). The purpose of the meeting is to update the USD(A&T) on the latest status of the program and to inform the senior acquisition officials of any outstanding issues. Normally the OIPT leader briefs the DRM. If outstanding issues are resolved at the DRM, the USD(A&T) may decide that a formal DAB meeting is not required and issue the ADM following the DRM.

The Joint Requirements Oversight Council (JROC) reviews all deficiencies that may necessitate development of major systems prior to any consideration by the DAB or, as appropriate, DOD CIO at MS I. The JROC validates an identified mission need, assigns a joint potential designator for meeting the need, and forwards the MNS with JROC recommendations to the USD(A&T). In addition, the JROC continues a role in validation of KPPs in program baselines prior to scheduled reviews for ACAT I and ACAT IA programs prior to all successive MDRs.

The OSD Cost Analysis Improvement Group (CAIG) reviews the Component Cost Position, prior to the scheduled MDR and determines if additional analysis is required. The product is an independent cost position assessment and recommendations based on its independent review of the life-cycle cost estimate(s), validation of the methology used to make the cost estimate(s), and determination if additional analysis or studies is required.

A formal DAB review is the last step of the DAB review process. Following presentations by the OIPT and a full discussion, the USD(A&T) as DAE decides to continue,

alter, or terminate the program. This decision is published as an ADM. The oversight & review process flow for an ACAT ID program is at Figure 11-9. With the approval of the USD (A&T), other committee reviews may be held for special purposes, such as to develop recommendations for the Under Secretary on decisions other than milestone or program reviews (for example, release of "withhold funds," baseline changes, AS changes).

The Army Systems Acquisitions Review Council (ASARC).

The ASARC is the Army's senior-level advisory body for ACAT IC and II programs and ACAT ID programs (DAB managed) prior to a DAB. The ASARC convenes at formal milestones to determine a program or system's readiness to enter the next phase of the materiel acquisition cycle, and makes recommendations to the AAE on those programs for which the AAE is the MDA. An ASARC may also be convened at any time to review the status of a program. The ASARC is co-chaired by the AAE and the VCSA.

The HQDA Information Technology (IT) Overarching Integrated Product Team (ITOIPT).

The ITOIPT is the Army's senior-level advisory body supporting the AAE and DISC4 (CIO) in their acquisition oversight role of ACAT IAC and IIA programs. The purpose of the oversight is to assist managers in resolving major issues supporting information requirements. The ITOIPT is chaired by the DISC4 as the Army CIO.

ASARC/ITOIPT membership includes the DUSA (OR); DUSA (IA); ASA (FM&C); ASA (I&E); ASA (MRA); CG, AMC; CG, TRADOC; General Counsel; DISC4; DCSLOG; DCSOPS; DCSPER; DCSINT; Chief, Army Reserve; Chief, National Guard Bureau; Chief, Legislative Liaison; Military Deputy to the ASA (ALT); Director, Program Analysis and Evaluation; CG, OPTEC and the Army IG (non-voting member). The following organizations are invited to attend if a significant issue is identified within their area of responsibility: The Chief of Engineers; Surgeon General; CG, Military Traffic Management Command; CG, U.S. Army Space and Strategic Defense Command; Commander, Safety Center; and the Chief of Public Affairs. The AAE makes the final decision as to attendance at the ASARC or ITOIPT.

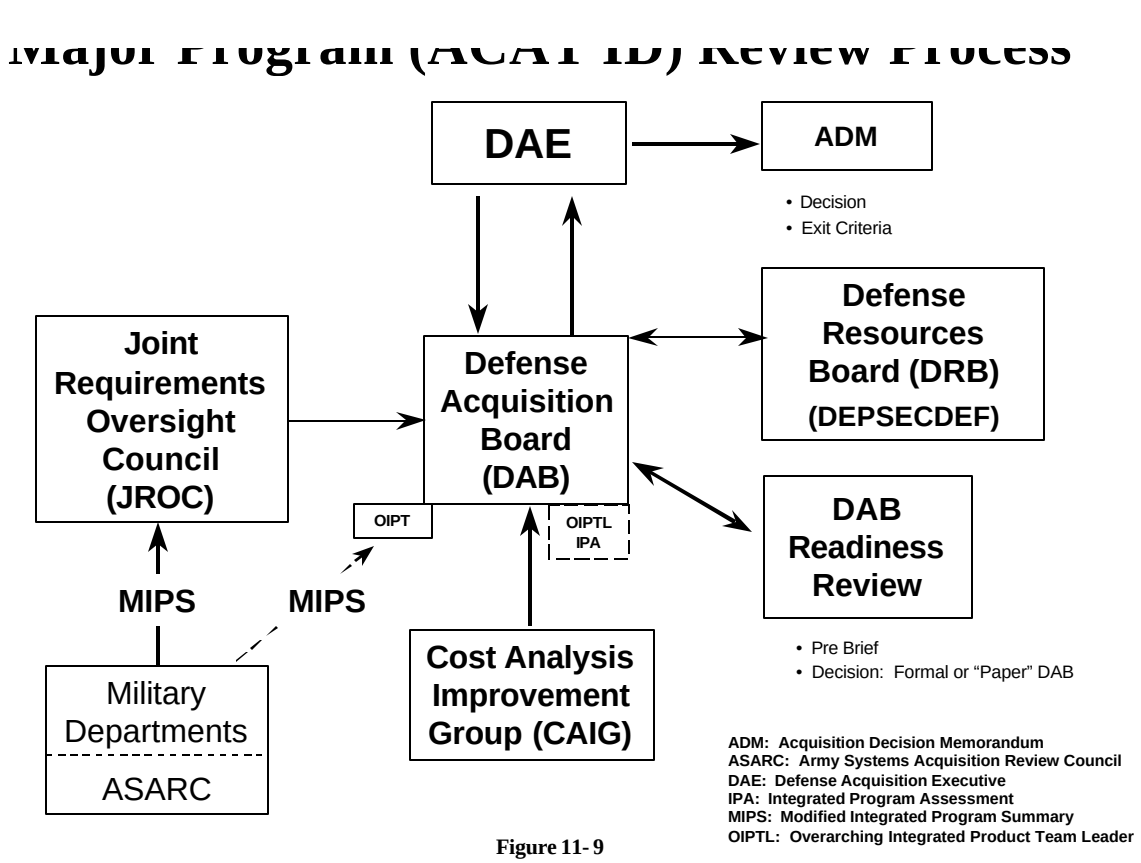


Figure 11- 9

The effectiveness of the ASARC/ITOIPT review process results from presentation of thorough analysis of all relevant issues and face-to-face discussion among the principals from the Army Secretariat, ARSTAF, and Major Commands (AMC and TRADOC).

In-Process Review (IPR).

The IPR is a formal review forum for ACAT III, and IV programs. General policies for reviews for IPR programs are the same as for ACAT I and II programs. Reviews are conducted at milestones and at other times deemed necessary by the MDA. The MDA or designee chairs the IPR.

The IPR brings together representatives of the MATDEV, the CBTDEV, the trainer, the logistician, and the independent evaluators for a joint review and decision on proceeding to the next phase of development. Their purpose is to provide recommendations, with supporting rationale, as a basis for system concept, system development, type classification, and production decisions by the appropriate level of authority. They are the forums where agencies responsible for participating in the materiel acquisition process can present their views and ensure that those views are considered during development, test, evaluation, and production. Unless informed otherwise, the MATDEV is delegated IPR authority for the system. Participation is extended to the appropriate testing agencies, HQDA representatives, and to such others as the IPR Chairman designates.

NOTE: The DOD & HQDA Major Automated Information System Review Council (MAISRC) were disestablished on July 28, 1998. The ASD (C3I), as the DOD Chief Information Officer (CIO), continues to be the Milestone Decision Authority (MDA) for ACAT IAM programs, as delegated by the DAE. The DISC4, as the Army CIO, continues to be the MDA for ACAT IAC & IIA programs, as delegated by the AAE.

TESTING AND EVALUATION

There are three major subprocesses that support the overall management process of a materiel acquisition system. The first major subprocess is testing and evaluation (T&E). All Army acquisition programs must be supported by an Integrated T&E strategy reflecting an adequate and efficient T&E program. The primary purpose of all T&E is to identify, assess, and reduce program risk (cost, schedule, technical). The T&E process consists of comparing the system or components against user requirements and specifications through testing, and evaluating the results to assess progress of design, performance, and supportability. The primary product of the T&E process is information (hard facts) for the MDA that makes a direct contribution to the timely development, production, and fielding of systems that meet the CBTDEV's requirements and are operationally effective and suitable.

The planning, programming, and budgeting for T&E begins early in the materiel acquisition process, concurrent with coordination of the draft MNS and ORD. Early integration is accomplished through the use of the Test and Evaluation Integrated Product Team (T&E IPT). The primary purpose of the T&E IPT is to optimize the use of the appropriate T&E expertise, instrumentation, targets, facilities, simulations, and models to implement test integration, thereby reducing costs to the Army. A Test and Evaluation Master Plan (TEMP), previously discussed, is the basic planning document for all life-cycle T&E related to a particular acquisition system. It is initially prepared by the ICT in phase 0, to support a MS I decision; and updated for each subsequent milestone review, when the APB has been breached, or on other occasions when the program has changed significantly. The DUSA(OR) is the TEMP approval authority for all ACAT I programs on the OSD T&E oversight list. TEMP format and content is in *DOD Regulation 5000.2R.*

A continuous evaluation process (CEP) is used to provide a continuous flow of T&E information. The data generated in early development phases is visible and maintained as the system moves into the formal testing activities, thereby avoiding duplication of testing. This process is continued through a system's post deployment activities to ensure responsible, timely, and effective assessment of the status of the system.

There are two broad categories of acquisition T&E: Developmental Test and Evaluation (DT&E), and Operational Test and Evaluation (OT&E).

DT&E is conducted to measure progress, usually of components/subsystems; assist the engineering design and development process in verifying attainment of technical performance specifications and objectives; and prior to the first major production decision, demonstrate that all significant design problems (compatibility, interoperability, reliability, availability, maintainability, and supportability) have been identified and that solutions to the known problems are in hand. DT&E is usually conducted under controlled or laboratory conditions. Developmental Testing (DT) determines system safety and human factors performance. DT generally requires instrumentation and measurements and is accomplished in factory, laboratory, and proving ground environments. DT is planned, conducted, and monitored by the developing materiel agency (normally AMC). The Test and Evaluation Command, (TECOM) is the developmental tester for AMC.

OT&E consists of field tests of any item (or key component) of weapons,

equipment, or munitions for the purpose of determining the effectiveness, suitability, and supportability for use in combat by typical military users, and the evaluation of the results of such tests. OT&E is conducted in realistic operational environments, with users that are representative of those expected to operate and maintain the system when fielded or deployed. Two examples of OT&E activities are:

- *Initial Operational Test and Evaluation (IOT&E).* IOT&E is conducted before the production decision (MS III) to provide a credible estimate of operational effectiveness and suitability; and
- *Follow-on Operational Test and Evaluation (FOT&E).* FOT&E is conducted on the deployed system to determine if required operational effectiveness and suitability are attained.

A major reorganization of the Army's T&E activities is currently under way with the merging of two test and evaluation commands into a new, unified entity removing the Army Materiel Command's (AMC) authority over developmental testing and ranges as shown in Figure 11-10. In accordance with a memorandum signed by the VCSA, AMC's Test and Evaluation Command (TECOM) at Aberdeen Proving Ground, MD, and the Operational Test and Evaluation Command (OPTEC) in Alexandria, VA will cease to exist no later than 1 October, 1999. In their place will be the new Army Test and Evaluation Command (ATEC).

The new ATEC will be organized around OPTEC, with its current headquarters serving in the same role for the new command. TECOM will leave AMC jurisdiction and move to ATEC as a subordinate command called the Developmental Test Command (DTC). TECOM's transfer to ATEC means AMC forfeits control and management of all test ranges including the Aberdeen Test Center, Yuma Proving Ground, AZ, Dugway Proving Ground in Utah, and White Missile Range, NM.

The Test and Experimentation Command (TEXCOM), Ft Hood, TX, will be reorganized into ATEC's Operational Test Command (OTC). OPTEC's Evaluation Analysis Center (EAC) and Operational Evaluation Command (OEC) will merge to become the Army Evaluation Command (AEC). ATEC will be a two-star command and report to the VCSA through the AVCSA.

ATEC's Test and Evaluation Coordination Offices (TECOs) will continue to provide on-site liaison between OPTEC and TRADOC schools/proponent centers/commanders providing operational T&E expertise and assistance to the proponent activities. TECOs are located at Fort Benning, GA; Fort Gordon, GA; Fort Knox, KY; Fort Monroe, VA; Fort Lee, VA; Fort Leonard Wood, MO; Fort Rucker, AL; and Fort Leavenworth, KS.

Major T&E Reorganization

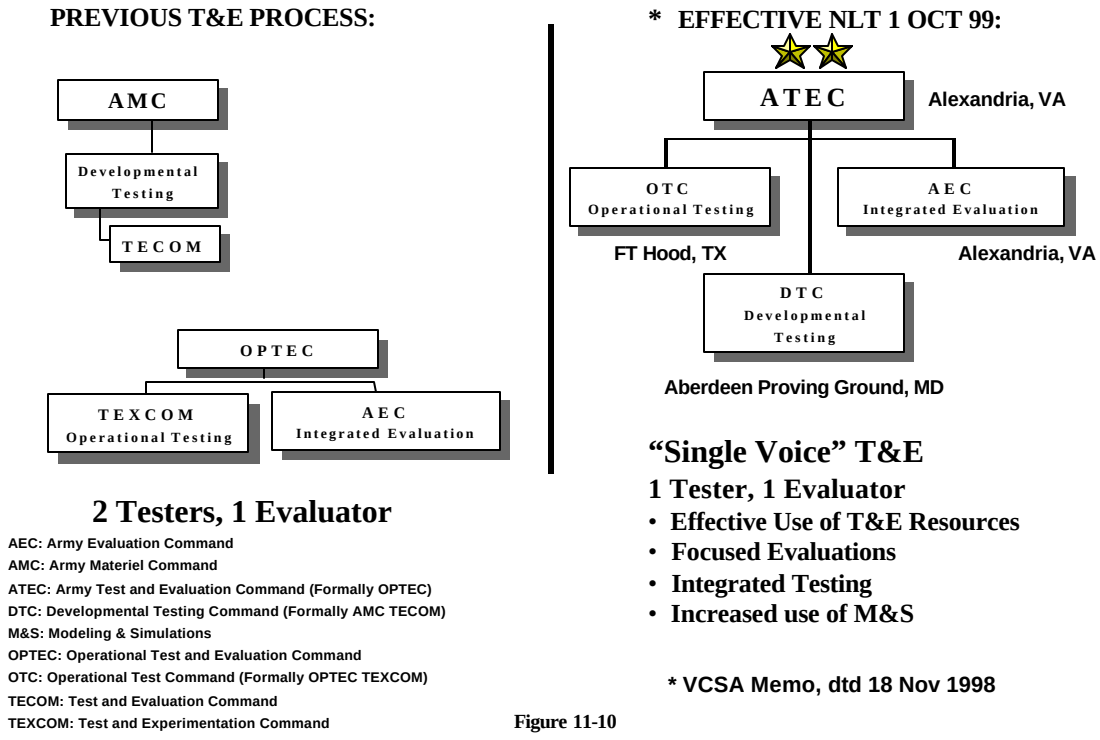


Figure 11-10

OT&E (and DT&E events requiring soldiers) is funded through the Army's Test Schedule and Review Committee (TSARC) process. The TSARC is a HQDA GO/SES centralize management forum that meets semiannually to review and coordinate the resources required to support the tests to be included in the Army's Five-Year Test Program (FYTP). The TSARC is chaired by CG, OPTEC. The TSARC process operates under *AR 15-38*. When approved for inclusion in the FYTP, a program's outline test plan (OTP) becomes authority for tasking in the current and budget years. The OTP is an acquisition program's formal T & E resource planning and tasking document.

INTEGRATED LOGISTICS SUPPORT (ILS)

The second major subprocess in support of acquisition system management is Integrated Logistics Support (ILS). ILS is a disciplined, unified, and interactive approach to the management and technical activities necessary to integrate logistics support into system and equipment design.

ILS considerations are integrated into the system design effort throughout the acquisition management process. The objective is to ensure that the developed systems are reliable, maintainable, transportable, and supportable. Concurrently, the required support resources must be developed, acquired, tested, evaluated, and deployed as an integral part of the materiel acquisition process. The 10 principal elements of ILS related to the overall system life-cycle are:

- Design interface;
- Maintenance planning;
- Manpower and personnel;
- Supply support;
- Support equipment;

- Training and training support;
- Technical data;
- Computer resources support;
- Packaging, handling, storage, and transportation; and
- Facilities.

Logistics supportability is a subset of cost, schedule, and performance. A continuous interface between the program management office and the manpower and logistics communities should be maintained throughout the acquisition process. ILS plans and programs, including NATO or bilateral allied support, should be structured to meet peacetime readiness and wartime employment objectives and tailored to the specific system. Innovative manpower and support concepts should be considered early in the development process, primarily to influence the design of the system being acquired. Alternative support concepts should be assessed during the requirements and concept formulation phases and at other appropriate points of the acquisition system management process. ILS is described in detail in *AR 700-127*.

MANPOWER AND PERSONNEL INTEGRATION (MANPRINT) PROGRAM

Introduction.

The third major subprocess in support of acquisition system management is the MANPRINT Program. MANPRINT is the Army's application of the DOD Human System Integration (HSI) requirements in systems acquisition *(DODD 5000.1 and DOD Reg 5000.2R)*, in compliance with Title 10. MANPRINT, described in detail in *AR 602-2*, is the Army's program to ensure that the "human" is fully and continuously considered as part of the total system in the development and acquisition of all systems and that human performance is always considered as part of "total system performance.

Seven MANPRINT Domains.

MANPRINT integrates and facilitates trade-offs among the following domains but does not replace individual domain activities, responsibilities, or reporting channels:

Manpower. The personnel strength (military and civilian) available to the Army. Manpower refers to the consideration of the net effect of Army systems on overall human resource requirements and authorizations (spaces), to ensure that each system is affordable from the standpoint of manpower. It includes analysis of the number of people needed to operate, maintain, and support each new system being acquired, including maintenance and supply personnel, and personnel to support and conduct training. It requires a determination of the Army manpower requirements generated by the system, comparing the new manpower needs with those of the old system(s) being replaced. If an increase in personnel is required to support a new (or modified) system, "bill payers" must be identified from existing personnel accounts.

Personnel Capabilities. Military and civilians possessing the aptitudes and grades required to operate, maintain, and support a system in peacetime and war. Personnel refers to the ability of the Army to provide qualified people in terms of specific aptitudes, experiences, and other human characteristics needed to operate, maintain, and support Army systems. It requires a detailed assessment of

the aptitudes which personnel must possess in order to complete training successfully as well as operate, maintain, and support the system to the required standard. Iterative analyses must be accomplished for the system being acquired, comparing projected quantities of qualified personnel with the requirements of the new system, any system(s) being replaced, and overall Army needs for similarly qualified people. Personnel analyses and projections are needed in time to allow orderly recruitment, training, and assignment of personnel in conjunction with system fielding.

Training. Considerations of the necessary time and resources required to impact the requisite knowledge, skills, and abilities to qualify army personnel for operation, maintenance, and support of army systems. It involves (1) formulating and selecting engineering design alternatives that are supportable from a training perspective (2) documenting training strategies, and (3) determining resource requirements to enable the Army training system to support system fielding. It includes analyses of the tasks that must be performed by the operator, maintainer, and supporter; the conditions under which the tasks must be performed; and the performance standards that must be met. Training is linked with personnel analyses and actions because availability of qualified personnel is a direct function of the training process.

Human Factors Engineering. Human Factors Engineering is the technical effort to integrate design criteria, psychological principles, and human capabilities as they relate to the design, development, test, and evaluation of systems. The human factors engineering goals are:

(1) To maximize the ability of the soldier to perform at required levels by eliminating design-induced error.

(2) To ensure materiel maintenance, support, and transport are compatible with the capabilities and limitations of the range of fully equipped soldiers who would be using such materiel. Human factors engineering provides an interface between the MANPRINT domains and system engineers. Human factors engineering supports the MANPRINT goal of developing equipment that will permit effective soldier-machine interaction within the allowable, established limits of training time, soldier aptitudes and skill, physical endurance, physiological tolerance limits, and soldier physical standards. Human factors engineering provides this support by determining the soldier's role in the materiel system, and by defining and developing soldier-materiel interface characteristics, workplace layout, and work environment.

System safety. The application of engineering and management principles, criteria, and techniques to optimize safety within the constraints of operational effectiveness, time, and cost throughout all phases of the system or facility life cycle.

Health hazards. The inherent conditions in the use, operation, maintenance, support and disposal of a system (e.g., acoustical energy, biological substances, chemical substances, oxygen deficiency, radiation energy, shock, temperature extremes, trauma, and vibration) that can cause death, injury, illness, disability, or reduce job performance of personnel.

Soldier survivability A soldier within the context of MANPRINT may refer to a military or a civilian.

(1) System. The characteristics of a system that can reduce fratricide reduce detectability of the soldier, prevent attack if detected, prevent damage if attacked, minimize medical injury if wounded or otherwise injured, and reduce physical and mental fatigue.

(2) Soldier. Those characteristics of soldiers that enable them to withstand (or avoid) adverse military action or the effects of natural phenomena that would result in the loss of capability to continue effective performance of the prescribed mission.

MANPRINT Objectives and Concept.

MANPRINT is intended to influence the design of developmental systems and the selection of nondevelopmental systems with the primary objective of *achieving maximum total system effectiveness at a reasonable and affordable life cycle cost of ownership*. The implementation of MANPRINT impacts total system performance (both effectiveness and availability) by making explicit the role that soldier performance plays and is shaped by design factors. MANPRINT also addresses the manpower, personnel, and training resources needed to achieve the required performance and, where possible, indicates more affordable configuration of manpower, personnel, and training resources.

The engineering design philosophy of MANPRINT is focused on optimum system performance on the battlefield, which includes consideration of both soldier and equipment capabilities and survivability. MANPRINT is an option-oriented process as opposed to an objective-oriented process. The MANPRINT process will provide decision makers information upon which to make trade-offs in areas such as quality and numbers of people, training times, technology, conditions, standards, costs, survivability, safety, health hazard risks, design and interface features, and personnel assignment policy.

The body of MANPRINT expertise, formerly known as the MANPRINT Joint Working Group, will continue to function through the Integrated Concept Team (ICT) and the Integrated Product Team (IPT) process. The MANPRINT members of the ICT will transition to the MANPRINT Working IPT (WIPT) when applicable. The purpose of this body is to: 1) assist the combat developer (CBTDEV or functional proponent) and program manager to ensure MANPRINT principles are applied to the system, 2) provide MANPRINT input to the Mission Needs Statement (MNS) and the Operational Requirements Document (ORD), and 3) provide a tracking system and historical database of MANPRINT issues

MANPRINT in System Design and Development.

MANPRINT technology base activities are concerned with increasing the body of knowledge relevant to actual or potential military human performance requirements. MANPRINT research and development produces information relevant to the design of systems and facilities. MANPRINT focuses on defining the human-centered issues identified for any given developmental approach. In addition, MANPRINT research focuses on emerging technologies to identify soldier performance enhancements and limitations and to indicate the

most effective use of technology to replace or supplement human activity.

MANPRINT supports determination and definition of system or materiel needs by providing total system performance forecasts for various concepts and by estimating the manpower, personnel, and training costs of alternatives. Human performance reliability data should be collected and evaluated to determine whether the proposed system concept delivers the expected performance using personnel with no greater aptitudes and no more training than planned.

MANPRINT supports the concept and studies activities through analyses focused on the human element impact on operational effectiveness and manpower resources.

MANPRINT front-end analyses are performed early in the development process and should focus on predecessor systems and lessons learned.

MANPRINT products, requirements, and activities should be integrated into the system procurement documents (contracts) and processes to include being a major area for source selection consideration.

MANPRINT data should be developed to support cost and other trade-off analyses, the Basis of Issue Plan *Feeder Data* (BOIPFD) and the Qualitative and Quantitative Personnel Requirements Information (QQPRI) documents. Additionally, MANPRINT issues should be incorporated into the system's test and evaluation program. A MANPRINT assessment should be prepared or updated for each milestone decision review.

In preparing for system fielding, MANPRINT actions should ensure new equipment training and institutional training are ready to prepare personnel to operate, maintain, and support the emerging materiel. Manpower spaces must be documented with sufficient lead time to ensure that personnel with the requisite skills and abilities are available to fill these spaces.

MANPRINT contributions to nondevelopmental acquisition programs are similar to those made for developmental programs. MANPRINT should be an evaluation factor in the market survey.

When a system is being modified, MANPRINT activities are an integral part of the modification. MANPRINT activities should be tailored to meet the needs of the system modification program.

Organizations and Key Personnel Involved in MANPRINT.

The Deputy Chief of Staff for Personnel (DCSPER) exercises primary Army staff responsibility for the MANPRINT Program. The DCSPER establishes MANPRINT policy and finalizes MANPRINT assessments for major programs.

The ICT group leader will ensure MANPRINT is incorporated in the ORD and track MANPRINT issues via Common Data Elements (CDEs). The CDE format is: Issue, Impact, What has been done, What has not been attempted and Who the proponent agency is. These issues will be passed to the TSM and PM. Additionally, the ICT group leader will have a MANPRINT representative at all materiel solution ICTs.

Once appointed, the program manager is responsible for executing the MANPRINT Program. This includes providing funding, resolving issues and concerns, and incorporating MANPRINT into program planning documents (e.g., contracts, Test and Evaluation Master Plan, Acquisition Logistics Plan, and equipment publications.) The program manager should brief the status of

MANPRINT efforts at milestone decision reviews.

The US Army Research Laboratory-Human Research Engineering Directorate (ARL-HRED) is the human factors engineering experts. Additionally they are focal point for MANPRINT integration and coordination.

The US ARL Research Laboratory - Survivability Lethality Analysis Directorate (ARL-SLAD) is the soldier survivability expert. Participates in the ICTs and MANPRINT WIPT as necessary. ARL-SLAD produces Survivability Assessments. Commanding General, U.S. Total Army Personnel Command (PERSCOM) Deputy Chief of Staff for Operations (DCSOPS) Force Integration Division (FID) MPT Domain Branch Participates in the ICTs and MANPRINT WIPT as necessary.

Office of the Surgeon General (OTSG) U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM), HHA Program Executive Agent performs Health Hazard Assessments. Participates in the ICTs and MANPRINT WIPT as necessary.

U.S. Army Safety Center, Independent Safety Assessors perform Safety Assessments. Participates in the ICTs and MANPRINT WIPT as necessary.

ACQUISITION STREAMLINING

Radical changes in the U.S. and global industrial bases, decreasing new technology development cycles, and declining defense budgets drive the need to streamline the materiel acquisition process. The globalization of industries means that many "systems" can no longer be manufactured and assembled solely in the U.S. The rapidly decreasing development cycle for new technologies means that state-of-the-art weapons systems cannot be fielded by an acquisition process that nominally takes years to develop and field a system. Declining defense budgets mean that doing "business" the "government way" is no longer affordable. Maintaining separate military and commercial industrial sectors is no longer feasible.

Today the Army's acquisition process must be agile and responsive enough to "turn inside the technology development cycle," be unburdened of non-value-added unique government requirements, and rely more frequently on commercial standards, products, and business practices.

Acquisition strategies and program plans must be implemented early in the life of the program. Concurrent engineering and development strategies have proven to produce weapon systems with fewer schedule delays and reduced risks. Integration of design with systems concept and design with the planning of the manufacturing, deployment, support, and disposal processes not only reduce the acquisition cycle time, but can also reduce cost and technical risks. This functional integration improves the acquisition processes while streamlining the overall program.

The Army Modernization strategy consists of three components - - a vision, goals, and investments. The vision is to "enable Army Vision 2010 by equipping a capabilities-based Army to achieve full spectrum dominance in conducting prompt and sustained joint operations while protecting the essential elements of science, technology, and industrial bases". The modernization strategy is executed by establishing specific goals to be achieved during the next decade. Focusing on achieving information dominance while maintaining combat overmatch allows the Army to eventually field a full-spectrum dominant land force for the next century. The five major goals (priorities) of Army modernization are:

- digitize the force,
- maintain combat overmatch,
- sustain essential research and development (R&D) and focus science and technology (S&T) to leap ahead technology for AAN,
- recapitalize the force, and
- integrate the active component (AC) and the reserve component (RC).

To achieve this vision, the Army has decided upon a strategy that prioritizes investments over time. The strategy reflects the linkage to every required pattern of operation. The requirements are based on well-articulated Joint and Army visions. These visions provide the operational concepts and patterns of operation that define the capabilities needed. The strategy links the capabilities of the visions to the systems that provide those capabilities. Modernization programs can now be considered and assessed not only in terms of the patterns of operations that they support, but also in terms of their investment categories.

The Army's requirements and modernization processes must be an efficient, effective, and flexible force coping with the rapid changing technology and socio-political environments to provide the warfighter timely, innovative solutions providing or maintaining the edge in all missions. Today, the Horizontal Technology Integration (HTI) program is the Army's primary modernization initiative providing a holistic approach to requirements determination; early enjoinment of the requirements, acquisition, and user communities in a team effort; and aggressive exploitation of leading edge technologies.

Horizontal Technology Integration (HTI).

HTI is the Army's modernization strategy for the future--upgrading existing weapon systems instead of developing new ones. Through HTI, the Army upgrades the force, maintains its technological edge on the battlefield, and enhances its combat power through the synergy of applying synchronized and common technologies across the force rather than to one or a few systems. HTI breaks away from the traditional "mission specific" modernization approach. Second Generation Forward Looking Infrared (FLIR) capability, Battlefield Combat Identification System (BCIS), Battlefield Digitization, Survivability Enhancement Systems, Combat Identification Dismounted Soldier System (CIDSS), Driver's Vision Enhancement (DVE), Thermal Weapons Sight (TWS), Embedded Diagnostics, Tactical Lasers, and Force XXI Battle Command Brigade and Below System (FBCB2) are the major HTI efforts underway at this time. These ten enabling technology programs provide capabilities that, when combined, enable the Army to reduce fratricide, improve situational awareness, firepower effectiveness, and command and control.

HTI is defined as the application of common enabling technologies across multiple systems to improve the overall warfighting capability of the force; lowering research and development costs and development time; and obtaining lower unit production costs by procuring larger quantities of the same subsystem for different weapons systems. The Army also benefits from a common logistics base for the same subsystems on multiple platforms. Above all, HTI provides the warfighter with the necessary improvements in lethality, survivability, and tempo to defeat any threat on the 21st century battlefield. HTI depends upon the use of CBTDEV-led ICTs for horizontal requirements integration and

MATDEV-led IPTs for program development and execution.

HTI Management and Implementation. HTI is implemented within the framework of existing acquisition processes, structures and organizations. A HQDA general officer working group (GOWG) is the central authority for all formal Army HTI initiatives and programs. The GOWG is co-chaired by the ADCSOPS-FD and the ASA (ALT) Deputy for Systems Management. GOWG members include HQDA representatives from ODCSOPS, ASA (ALT), ASA (FM&C), DISC4, and PA&E, along with TRADOC, AMC, and OPTEC representatives. They establish the HTI "blueprint", synchronize and prioritize efforts, provide specific guidance, resolve issues, and provide general officer-level direction, guidance, and oversight. In addition, the ASA (ALT) Deputy for Systems Management acts as the Army HTI executive agent and determines, coordinates, and issues specific guidance for HTI programs implemented across multiple PEO/PM structures and organizations.

The HTI process begins with an operational concept, FOC, or system requirement. The appropriate management structure is then chartered to implement an HTI initiative through the application of specific programs. HTI initiatives follow established acquisition management procedures. The ASA (ALT) ensures the technology insertion is completely synchronized through management oversight of the respective Army laboratory, Army research, development and engineering centers (RDECs), PEOs and PMs. The individual HTI efforts are managed as a part of planned S&T objectives (STOs), new system developments, and/or system modifications. This increased management focus ensures that the technology development plan or weapon system acquisition strategies/plans are designed with an overall horizontal approach to development and execution. This includes possible joint service, allied nation or industry applications. HTI initiatives are resourced through individual Management Decision Packages (MDEPs) on a case by case basis. There is an MDEP established to provide funding for both common, government-furnished hardware, and for the actual insertion and integration of the common hardware onto the designated weapon systems. As a process, HTI supports an integrated battlefield architecture that exploits the capabilities of combat, materiel and training developers, national laboratories, industry and academia to achieve total force synergism. Its purpose is to provide increased modernization efficiency and responsiveness while enhancing overall force warfighting effectiveness. As the HTI process matures, the need to create centralized funding lines, specific charters and requirements documents, along with creating specific task forces or PM organizations, are addressed.

Some potential challenges or disadvantages to using an HTI acquisition approach are acknowledged. Realigning program schedules, changing technical approaches, and altering funding strategies in order to horizontally insert technology or implement product improvements could result in higher up-front costs. Major modifications of certain older generation systems may also be required for those systems to accept newer technology. Additionally, funding the technology insertion for several different systems must be consistent and executable. HTI needs to be a basic part of program development and planning. However, HTI principles are applied only where it makes sense for total force efficiency and effectiveness. *AR 70-1* provides

more detailed information on HTI planning and execution.

ACQUISITION RESOURCES MANAGEMENT

The "color of money," or kind of appropriation, is an important factor in acquisition management. In general, a particular appropriation can be expended only for specified activities, and money cannot be changed from one appropriation to another. Acquisition management involves at least two appropriations, and may involve four. The two-year RDTE appropriation provides funds for research, design engineering, prototype production, and test and evaluation activities in the course of developing a materiel system. The three-year Procurement appropriation provides funds for procuring materiel that has been fully tested and type classified. Procurement funds are also used to procure low-rate initial production (LRIP) systems for operational testing, initial spares, and support and training equipment. The Operations and Maintenance, Army (OMA) appropriation provides funds for retiring and retrograding the old equipment being replaced, for repairing systems after fielding, for fuel and ammunition for training and operations, for periodic system rebuild, for training both system operators and maintainers, except new equipment training, and, in general, anything else to keep a system in the field and operating. Some systems may require Military Construction, Army (MCA) appropriated funds for the construction of special facilities required for fielding that system.

Funds of the correct amount and appropriation must be planned and programmed into the Army budget, in general, two years before they are needed. In the program and budget process, fund requests are initiated or reviewed annually. Congress appropriates funds for RDTE (Title V) and Procurement (Title IV) as part of the "Defense Appropriation Act." The RDTE and Procurement Appropriations must first be approved by DOD, submitted to Congress by the President, and then be authorized and appropriated in two separate congressional actions before any money can be spent. In the year of budget execution, the Army may reprogram funds, except for congressional interest items, within an appropriation subject to limits, or with prior congressional approval. Up to $4 million of RDTE and $10 million of Procurement may be reprogrammed into a program without prior congressional approval. The MATDEV is responsible for planning and programming the RDTE and Procurement funds to cover a program, and the MCA, when needed. The MATDEV is responsible for programming all life-cycle system costs for the system while the system remains under his management control. This includes programming for outyear sustaining resources as well as RDTE and Procurement. Once the management responsibility transitions to the managing AMC "commodity command", it then becomes that command's responsibility to continue the depot-level sustaining program. The field user MACOM is responsible to program day-to-day system below-depot operational support. The field user MACOM is responsible for planning and programming the OMA funds needed to ensure continued readiness of the fielded system. Responsibility for planning and programming funds for product improvements and sustaining supply spare parts is complex and divided between the MATDEV and the field MACOM.

RDTE Appropriation-6 Categories.

To assist in the overall planning, programming, budgeting, and managing of the various R&D activities, the RDTE program is divided into 7 R&D categories. These categories are used throughout DOD. In November 1993, OSD realigned the Program Category as the Budget Activity and deleted the old Budget Activity. This change became effective for FY95. The current RDT&E Budget Activities are as follows.

Budget Activity 1–Basic Research. Basic research efforts provide fundamental knowledge for the solution of identified military problems. Includes all efforts of scientific study and experimentation directed toward increasing knowledge and understanding in those fields of the physical, engineering, environmental, and life sciences related to long-term national security needs. It provides farsighted, high payoff research, including critical enabling technologies that provide the basis for technological progress. It forms a part of the base for (a) subsequent applied and advanced developments in Defense-related technologies, and (b) new and improved military functional capabilities in areas such as communications, detection, tracking, surveillance, propulsion, mobility, guidance and control, navigation, energy conversion, materials and structures, and personnel support. Basic research efforts precede the system specific research described in the *ASTMP*.

Budget Activity 2–Applied Research. This activity translates promising basic research into solutions for broadly defined military needs, short of major development projects, with a view to developing and evaluating technical feasibility. This type of effort may vary from fairly fundamental applied research to sophisticated breadboard hardware, study, programming and planning efforts that establish the initial feasibility and practicality of proposed solutions to technological challenges. It should thus include studies, investigation, and nonsystem specific development effort. The dominant characteristic of this category of effort is that it be pointed toward specific military FOCs with a view toward developing and evaluating the feasibility and practicability of proposed solutions and determining their parameters. Program control of the applied research element will normally be exercised by general level of effort. Applied research precedes the system specific research described in the *ASTMP*.

Budget Activity 3–Advanced Technology Development. This activity includes all efforts, which have moved into the development and integration of hardware and other technology products for field experiments and tests. The results of this type of effort are proof of technological feasibility and assessment of operability and producibility that could lead to the development of hardware for Service use. It also includes advanced technology demonstrations (ATDs) that help expedite technology transition from the laboratory to operational use. Projects in this category have a direct relevance to identified military needs. Advanced technology development may include concept exploration as described in the *ASTMP*, but is nonsystem specific.

Budget Activity 4–Demonstration and Validation. Includes all efforts associated with advanced technology development used to demonstrate the general military utility or cost reduction potential of technology when applied to different types of military equipment or techniques. It includes evaluation, synthetic environment, prototypes, and proof-of-principle

demonstrations in field exercises to evaluate system upgrades or provide new operational capabilities. The demonstrations evaluate integrated technologies in as realistic an operating environment as possible to assess the performance or cost reduction potential of advanced technology. It may include concept exploration as well as program definition and risk reduction as described in *DODD 5000.1*, but is system specific.

NOTE: DODD 5000.1 changed the acquisition phase name (phase I) that BA 4 supports from Demonstration and Validation to Program Definition And Risk Reduction.

Budget Activity 5 – Engineering and Manufacturing Development. Includes those projects in engineering and manufacturing development for Service use. This area is characterized by major line item projects and program control is exercised by review of individual projects. Includes engineering and manufacturing development projects as described in *DODD 5000.1*, and may include OT&E.

Budget Activity 6 – RDT&E Management and Support. Includes efforts directed toward support of RDT&E installations or operations required for use in general research and development (R&D) and not allocable to specific R&D missions. Included are technical integration efforts, technical information activities, space programs, major test ranges, test facilities and general test instrumentation, target development, support of operational tests, international cooperative R&D, and R&D support.

Budget Activity 7 – Operational System Development. Includes R&D effort directed toward development, engineering, and test of changes to fielded systems or systems already in procurement which alter the performance envelopes. Operational system development may include OT&E costs. FY 99 R&D support to miscellaneous operational efforts include: Combat Vehicle Product Improvement Program (PIP), MLRS PIP, Horizontal Battlefield Digitization, Satellite Communication Ground Environment, etc. Program control is exercised by review of individual projects.

Procurement Appropriations.

The Procurement Appropriation funds the procurement of materiel systems that has been fully tested and type classified. The Army budget includes six separate procurement appropriations listed as: (1) Aircraft, (2) Missiles, (3) Weapons and Tracked Combat Vehicles (WTCV), (4) Ammunition, (5) Other Procurement, Army (OPA), and (6) Chemical Agents & Munitions Destruction, Army (CAMDA).

Aircraft Appropriation. Aircraft procurement includes the procurement of aircraft, aircraft modifications, spares, repair parts, and related support equipment and facilities.

Missile Appropriation. Missile procurement includes the procurement of missiles, missiles modifications, spares, repair parts, and related support equipment and facilities.

Weapons and Tracked Combat Vehicles (WTCV) Appropriation. Weapons and Tracked Combat Vehicles (WTCV) procurement includes tracked and combat

vehicles, weapons, other combat vehicles, and repair parts.

Ammunition Appropriation. Ammunition procurement includes procurement of ammunition end items, ammunition production base support, and ammunition demilitarization.

Other Procurement, Army (OPA) Appropriation. OPA covers three major categories: (1) tactical and support vehicles, (2) communications and electronic equipment, and (3) other support equipment.

NOTE: Chemical Agents & Munitions Destruction, Army (CAMDA) is an Army appropriation beginning in FY99.

Program Stability.

Achieving early program objective consensus and following a good investment strategy will yield a stable program, clearly showing where we are today and where we want to be when we bring on the new system. To be successful, new systems acquisition programs must be developed and acquired in a timely and economical manner. Life-cycle cost estimates and changes to programs and schedules must be controlled. Changes to programs affecting established goals will be fully documented in the program management documentation, providing the justification for change (for example, budget cut, design change). After entering Phase II - Engineering and Manufacturing Development, design changes in system components that are meeting the approved requirement are discouraged and must be individually justified. The design should be frozen in sufficient time prior to DT&E and OT&E to provide an adequate system support package for testing. Changes to programs as a result of DT&E/OT&E must be of the "objective" nature to satisfy the requirement and not a "threshold" type of change, unless it can be demonstrated that the change will not have a significantly negative impact on the cost, schedule, producibility, and ILS aspects of the program.

ACQUISITION REFORM

With a wide range of missions, global uncertainty, increased global technology transfer, and limited RDA resources, the Army has been a leader in acquisition reform. For example, the TRADOC Battle Labs and the Advanced Warfighting Experiments (AWEs) have shown to be critical in simulating, experimenting, and assessing advanced technologies and concepts, thereby accelerating and improving both the requirement determination and acquisition processes. Every ATD is required to be sponsored by a TRADOC Battle Lab and have at least one experiment performed at a Battle Lab. The ACT II program, previously discussed, is funding competitively selected proposals from industry to demonstrate promising technology and prototypes of keen interest to all the Battle Labs in satisfying priority FOCs. The OSD ACTD initiative allows rapid prototyping of promising technologies that provide real capabilities for the joint warfighting customer to evaluate.

A new partnership has been established among warfighter, Army acquisition, and industry organizations to identify technology options more quickly, establish the best technical approaches, conduct solid price-benefit trade studies, develop performance requirements, program the funding needed, and issue concise solicitations consistent with the

foregoing. The Battle Labs, HTI ICTs, and team efforts such as Team Comanche and Team Crusader are examples of the power of IPPD and IPTs that bring the stakeholders together to solve tough acquisition and requirements tasks concurrently and quickly. The Army continues to overcome organizational stovepipes and is mastering HTI and information technology in a timely and affordable manner.

Another consideration in the acquisition reform process is how the Army deals with industry. Through performance specifications and streamlined, tailored, page-limited solicitations, the Army gives them maximum flexibility by telling them what it wants as an end item and not how to do it or how to get there. Furthermore, the Army leverages commercial technologies, products, and processes and establishes open architectures that facilitate future upgrades, using to advantage the commercial information technology revolution and rapid advances in computers. These initiatives have shortened acquisition times for quality upgrades, reduced life-cycle costs, and allowed the acquisition community to easily integrate exciting new technologies as they become available. A highly successful process to focus and leverage all of our acquisition reform initiatives in support of Army XXI is the Acquisition Reform Reinvention Centers and Laboratories.

Army XXI Reinvention Centers.

In the past several years, the SA has delegated far-reaching authorities to Army XXI Reinvention Centers in order to reengineer processes and redesign organizations to support core competencies required for the U.S. Army in the 21st century. To accomplish the Army's missions in an era of declining resources, it must complete a plan that will make it a more flexible organization that can reach out to both the fighting and sustaining elements of Army XXI with the best concepts and technologies available in the future. The Reinvention Center designation allows the Army to mass ongoing initiatives to overpower many current restraints impacting the Army's mission. The SA has designated three reinvention centers: FORSCOM, TRADOC, and HQDA. The authorities delegated by the SA to these three reinvention centers in pursuing reinvention efforts are:

- *Coordination Authority*: permission to deal directly with OSD and other reinvention centers or laboratories without having to go through the DA staff first.
- *Authority Regulatory Waiver*: permission to waive DA and MACOM regulations, directives, instructions, and/or publications, with certain limitations.
- *Legislative Change Proposal Authority*: permission to submit proposed legislative changes directly to the Office of the Chief of Legislative Liaison (OCLL) without having to filter through the DA staff.
- *Lab and Prototype Authority*: Permission to designate reinvention center laboratories and prototypes, as needed, with no reporting requirements outside of the reinvention center.

Army XXI Acquisition Reform Reinvention Laboratory.

The Army XXI Acquisition Reform Reinvention Laboratory was approved by the SA and CSA on July 1, 1996. The Reinvention Lab's focused goal is to identify, test, procure, and field technically advanced systems and

equipment for Army XXI by the year 2000. The Reinvention Lab process will enable the Army to use acquisition reforms effectively, to take high value technologies from prototype status following AWE and convert them into fieldable materiel systems and equipment in time to field the first Army XXI digitized division by 2000 and the first Army XXI Corps by 2004.

The Acquisition Reform Reinvention Laboratory is a conglomerate of 94 acquisition reform initiatives involving everything from lower staff levels at brigade headquarters to new software, hardware, acquisition processes and paperwork reduction. It takes advantage of every acquisition time and cost cutting initiative given to the Army by Congress and DOD, including simplifying procedures, using commercial practices, streamlining processes, and using commercial credit cards and electronic commerce. The Reinvention Lab is responsible for making efficient and effective all processes involved in the acquisition and fielding of equipment for Army XXI. The Warfighting Rapid Acquisition Program (WRAP) is the primary streamlining process used by the Reinvention Laboratory to accomplish it's Army XXI goals.

Warfighting Rapid Acquisition Program (WRAP).

The WRAP was established on April 11, 1996 primarily to accelerate fielding of systems and technology that emerge from TRADOC battle lab warfighting experiments. WRAP applies to AWEs, CEPs, ATDs, ACTDs and similar experiments where a TRADOC ICT supported by a TRADOC battle lab are directly involved. Normally, such systems and technology emerge from the experimentation process as unfinanced "new starts." If an approved new start cannot be acquired under existing MDA authorities and funding, the CG, TRADOC can initiate a WRAP ASARC to obtain approval of candidates based on compelling experimentation success and urgency of need. Supporting criteria include: technical merit and maturity, criticality and priority to warfighting requirements, affordability, effectiveness, and supportability and sustainability into the next Army POM. Successful WRAP candidates are ranked by priority and receive funding for operational prototypes in priority order.

The WRAP ASARC is normally scheduled in the March-April and August-September time frames, to identify what projects to fund and to accommodate PPBES actions. A WRAP ASARC can be held at other times if appropriate. When convened by the CG, TRADOC the WRAP ASARC:

- reviews requirements and urgency;
- reviews affordability;
- reviews experimentation results;
- approves the AS;
- assigns management responsibility to an AMC advanced concepts manager (ACM) or designates PEO/PM;
- assigns a milestone entry point, as appropriate; and,
- approves a funding strategy.

WRAP Documentation. The MNS is the normal document needed to support TRADOC AWEs. A MNS is not required if an FOC list can support the WRAP requirement traceability. For candidates selected for rapid acquisition, a streamlined operational requirement statement (ORS) is sufficient to support the WRAP ASARC and for documentation during the two years before regular programming begins. Items not

approved for rapid acquisition will convert to normal documentation over a set time period. The ORS for rapid acquisition is not a requirements document. The format is provided in *Appendix C, AR 71-9*. Supplementary WRAP documentation normally includes: urgency of need statement, experimentation results documenting compelling success, proposed acquisition strategy, and a budget estimate for the proposed program.

WRAP Funding. In the FY 97 Appropriation Act, Congress approved an Army budget line dedicated for Force XXI initiatives. Financing from this line is used to jump start technology programs and field limited quantities of approved requirements emerging from the Force XXI process as quickly as possible, without having to reprogram funds from other budget lines. Financing in this manner is limited to providing enough funds only to bridge the gap (normally two years) until the total funding requirements for a new start can be budgeted. WRAP initiatives can also be funded through reprioritizing or reprogramming activities. The execution of Force XXI initiatives funding is subject to approval from the WRAP ASARC, which oversees WRAP efforts.

The ASA (ALT) directs and controls the Army XXI Acquisition Reform efforts through the Deputy for Systems Management, who functions as the Director of the Reinvention Laboratory.

NOTE: It should be noted that the Army XXI Acquisition Reform Reinvention Laboratory is not a single organization. It is a "virtual" Laboratory for integrating, improving, and controlling all the cross-functional processes performed by those organizations supporting the materiel acquisition for Army XXI.

Fast Track Acquisition Program.

Fast Track is an initiative of the Science and Technology community which formalizes a method to promote the effective, timely transition of high value, high priority technology into the acquisition process. As such, it is a minor change, but an important contribution to Acquisition Reform. The intent is to avoid program and funding gaps and duplication of effort. In most cases a more robust S&T program precludes the need for a Program Definition and Risk Reduction life-cycle phase I.

Fast Track Acquisition implements two step acquisition, as recommended by the Army Science Board. It provides up front designation to a select few Advanced Technology Demonstrations (ATDs), previously discussed in this chapter, that have a good chance of successful transition to the Engineering and Manufacturing Development (EMD) Phase II. The designation is essential in obtaining increased management attention from stakeholders and justifying the expenditure of additional S&T funds preparing for program transition to the EMD phase. Fast Track is closely linked to Army force modernization, focusing on developing critical capabilities which address future warfighting needs, and delivering timely and affordable technologies that support the upgrading of existing systems and the fielding of next generation and future systems

The Fast Track applies to a few selected technology demonstrations which, as a result of earlier S&T efforts, appear to be sufficiently mature that:

1. they can be demonstrated during a 6.3 ATD program with moderate risk, and
2. there is a reasonable likelihood of skipping the Program Definition and

Risk Reduction (PDRR) Phase I and transitioning directly to the EMD phase II which is already funded in the Program Objective Memorandum (POM), which results in measurable time and cost savings.

Fast Track is applicable to all Acquisition Categories (ACATs) subject to ASARC, Army ITOIPT, or IPR oversight. On average, the Army Science and Technology Working Group (ASTWG) may recommend only one Fast Track candidate per year.

Fast Track Process. The Fast Track process focuses on synchronizing technology candidates with the acquisition process. In the initial phase, Phase 0, the ASTWG reviews, evaluates and recommends Fast Track candidates to the Milestone Decision Authority (MDA) for approval as a Fast Track program. The MDA evaluates not only the priority of the requirement and the maturity of the technology but also verifies that there is funding in the POM and Extended Planning Period (EPP) to take the technology through EMD and production.

Phase 0 continues for up to one year beyond the successful conclusion of the ATD to transition the S&T program to program management. This provides up to a one-year transition period for risk reduction initiatives and MS I/Il decision review preparation. During this transition period, the MDA-identified EMD Program Manager (PM), and Program Executive Officer (PEO) or MATDEV EMD PM, requests placement of the Fast Track program in the appropriate ACAT and prepares all necessary documentation for the MS I/Il acquisition review. If necessary, the ATD manager may request a formal transition review during the transition period prior to the Milestone (MS) I/Il decision.

At the conclusion of Phase 0, the MDA will determine if the results of Phase 0 warrant approval for program establishment and entry into EMD. Once the program is approved for EMD, it follows normal life-cycle management requirements for MS III approval.

Requirement determination activities are the responsibility of the CBTDEV proponent who establishes a multidisciplinary ICT. Deficiencies in current capabilities, and opportunities to provide new capabilities, are expressed in broad operational terms in a MNS. The validated MNS is presented to the MDA prior to the Fast Track decision. Initial requirements remain flexible. Participation by the ATD in a technical demonstration assists the ICT in understanding the "art of the possible" and provides the basis for finalizing requirements before the end of Phase 0. These are expressed as system performance objectives and thresholds in an ORD, and are developed from, and remain consistent with, the MNS. The ORD is presented to the MDA prior to the MS I/II decision.

OPTEC supports Phase 0 by assisting in the design of experiments, collection of data, and evaluation of results. Data collected in Phase 0 is used to support the MS III decision at the end of EMD. The reuse of appropriate data reduces the scope of testing during EMD.

Initially, the MATDEV establishes a single Integrated Product Team (IPT) with the ATD manager as chairman. The IPT is a fully integrated, stakeholders team. Membership includes TRADOC, Department of the Army Staff (Deputy Assistant Secretary for Research and Technology, Deputy for Systems Management and Horizontal Technology Integration, etc.), PM, PEO or MATDEV, logisticians, S&T manager, OPTEC, and the Office of the Secretary of Defense (OSD) as appropriate. The IPT decides the appropriate

program management structure. This may include establishing a Fast Track program under a PM, and PEO or MATDEV, management structure. The IPT initially addresses as minimum, affordability issues (including CAIV), Integrated Logistics Support issues, Pre-Planned Product Improvement, Horizontal Technology Integration, producibility, and technical and operational testing. The IPT assists the designated PM in identifying the appropriate ACAT and preparing all necessary documentation for the MS I/II decision.

ASTWG approved Fast Track candidates may be submitted to the MDA for a MS 0 decision at any time. Fast Track designation is contingent upon sufficient funding in the POM and EPP to advance the technology to a MS I/I1 decision and through production. Fast Track designation is not a guarantee of funding. Fast Track programs compete for resources in the DCSOPS Research, Development and Acquisition (RDA) prioritization process. An approved Fast Track program loses the Fast Track designation if program funding falls out of the POM/EPP.

The Fast Track Acquisition Process is completed when the MDA convenes a MS I/I1 decision review. The MDA has three options. It can approve a MS I/I1 decision and entry into EMD; if the ATD was unsuccessful, approve entry into the PDRR Phase; or cancel the program.

Documentation for Fast Track Decision. The ATD manager is responsible for ensuring that the Army ATD Management Plan (ATDMP) and the validated MNS are available in addition to other documentation identified by the MDA as necessary for Fast Track designation. The ATDMP does not limit itself to the plan for the ATD and instead articulates the plan for the entire Phase 0 including transition planning. In this form, the ATDMP is the Fast Track Acquisition Strategy. The ATDMP is supplemented with S&T experimentation results that assist the MDA in assessing the maturity level of the technology.

Fast Track Decision. To complete the Fast Track designation decision, the MDA takes the following actions:

1. reviews MNS.
2. assesses technology maturity level.
3. approves Advanced Technology Demonstration Plan.
4. approves Phase 0 exit criteria.
5. validates resources required to execute program and adequacy of follow-on resources.
6. assigns PM, and PEO or MATDEV PM, to support ATD manager.
7. approves the transition plan.

Documentation for Fast Track Milestone I/Milestone II. The MDA-designated EMD PM prepares for the MS I/Il decision. The S&T program presents the results of Phase 0, transitions the S&T program to the PM, and assists the PM in preparation for the MS I/Il decision. The CBTDEV documents and submits the ORD. The PM, and PEO or MATDEV, submits the Acquisition Program Baseline (APB), acquisition strategy, and EMD Phase exit criteria. The PM also obtains any other documentation identified by the MDA as necessary for the MS I/Il review.

Fast Track Milestone I/Milestone II Decision. To complete the Fast Track Milestone I/II decision, the MDA takes the actions identified below:

1. determines if the results of Phase 0 warrant continuation of the program,

2. assesses the readiness of the program to proceed to EMD,
3. approves a MS I/Il decision, and
4. approves Phase II Exit Criteria.

NOTE: On January 28, 1998 the Army approved the first Fast Track program. It approved transferring the Future Scout and Cavalry System (FSCS) from its initial Advanced Technology Demonstration (ATD) status to a traditional Engineering and Manufacturing developmental phase (phase II) of systems acquisition.

SUMMARY

This chapter provided a basic introduction to the management process, organization, and structure of research, development, and acquisition. Through the chapter description, the reader should gain an appreciation of the logic of the process, its organization and management This chapter also highlights the current basic policies for materiel acquisition, recently updated DOD and Army policies for materiel systems, the Army's acquisition objectives, and descriptions of acquisition managers.

Difficult decisions, a scarcity of dollar resources, and honest differences of opinion cause disruptions and delays. It is unlikely that there will be total agreement on the best technical approach to satisfy a need--or, indeed, on the need itself. The annual budget cycle and budget constraints almost ensure that some projects will not be funded at the level desired--if at all. Tests are not always successful. Estimates of time, costs, effectiveness, and technical feasibility are often wide of the mark for complex systems. After all, they are estimates that are projected well into the future based on sketchy data. These real-world problems reinforce the fact that research, development, and acquisition (RDA) management is a complex task of great importance to national defense. RDA can be a wellspring of new and effective weapons systems where effective management and professionalism can make the difference on any future battlefield. As with any activity involving the use of scarce resources to meet organizational goals and objectives, the people involved--the acquisition managers and the soldier users and maintainers--constitute the most vital link to mission accomplishment.

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